

351497

## APPENDIX C

# QUALITY ASSURANCE PROJECT PLAN

FOR

## REMOVAL ACTIVITIES

AT THE

**TOLEDO TIE TREATMENT SITE**

LOCATED AT

**ARCO INDUSTRIAL PARK  
TOLEDO, OHIO**

**FEBRUARY 1998  
(Revised April 1998)  
Amended January 2000**

Prepared For:

**KERR-McGEE CHEMICAL, LLC  
KERR-McGEE CENTER  
OKLAHOMA CITY, OKLAHOMA 73125**



Prepared By:

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*Summary of Amendments to Quality Assurance Project Plan*

1.0 Introduction

Modification on page 1 of 33, 1<sup>st</sup> and 2<sup>nd</sup> paragraphs to reference QAPP applies to EE/CA, rather than time critical activities

2.0 Section 2.2.3 amended to reflect name change for Field Operations Coordinator, page 4 of 33

3.0 No amendments

4.0 Section 4.0 amended to reference QAPP applies to EE/CA, rather than time critical activities AND amendments to the sample identification number process, Section 4.2.3. One page left blank intentionally to maintain consistency with page numbering of approved QAPP, April, 1998.

5.0 No amendments

6.0 No amendments

7.0 Amended to reflect storm sewer sediment sampling and addition of Table C.6

8.0 Section 8.4 amended to reflect name of third-party data validator, page 20 of 33

9.0 No amendments

10.0 No amendments

11.0 No amendments

12.0 No amendments

13.0 No amendments

14.0 No amendments

15.0 Section 15.0 amended to include additional reference

Figure C.1 Amended to reflect change in Field Operations Coordinator

Tables C.1, C.2, C.3, and C.5 amended to reflect EE/CA parameter list, sample containers and preservation, sample identification number process and analytical methods. Table C.6 added to reflect parameter list for storm sewer sediment and waste pile sampling.

Attachment A reflects the most recent laboratory QA manual for Lancaster Laboratories

## C.1.0 INTRODUCTION

### C.1.1 General

Kerr-McGee Chemical, LLC (Kerr-McGee) was issued a Unilateral/Administrative Order (UAO) dated December 24, 1997, pursuant to Section 106(a) of the Comprehensive Environmental Response, Compensation, and Liability Action (CERCLA) pertaining to the Toledo Tie Treatment Site located in Toledo, Ohio (Site). Preparation of this document is in accordance, to the maximum extent practicable, with the provisions of the UAO, Docket No. V-W-'98-C-444. A more detailed description of the Site and the proposed work activities is included in the Engineering Evaluation/Cost Analysis (EE/CA) Support Sampling Plan (SSP) (HAI Document KMC002.100.0006, Amended January 2000).

This Quality Assurance Project Plan (QAPP) has been prepared for personnel representing Kerr-McGee, the U.S. Environmental Protection Agency (EPA), and HAI field personnel conducting the investigation. The QAPP is intended to provide the quality assurance and quality control guidelines for the activities described in the EE/CA SSP.

The analytical subcontractor for this project will be Lancaster Laboratories. All analyses will be performed at their Lancaster, Pennsylvania facility. Lancaster's QAPP has been included as Attachment A of this document. If an alternate laboratory is required, its QAPP will be submitted as an addendum to this plan.

### C.1.2 Objective

The objective of this plan is to document the procedures that will be used to collect sufficient data of known quality for the non-timecritical portion of this project. This plan is intended to be used as supplemental guidance to the EE/CA SSP. The quality assurance measures for the analytical program will be in accordance with the appropriate U.S. EPA methods, good laboratory practices, and the laboratory's quality assurance program (located in Attachment A).

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Table C.1 provides the anticipated list of the parameters to be analyzed and the accompanying methods. Reporting limits for all parameters will be in accordance with the provisions of the analytical methods used and good laboratory practices. Reporting limits may vary between samples as they can be affected by sample matrix, dilutions, and other interferences. If additional analytical methods are required, this document will be revised accordingly by addendum.

4. monitor the progress of the field sampling personnel and enforce provisions of this plan; and
5. stop work at any time that the QAPP is not being adhered to, or if the quality of the results are jeopardized by the work in progress; once work is stopped, only the PM can restart activities.

#### **C.2.2.3 Field Operations Coordinator (FOC)**

The FOC for this project will be Mr. Tom Covrett. Mr. Covrett will be responsible for overseeing the day-to-day conduct of project activities. Duties and responsibilities of the FOC will be to:

1. ensure the sampling activities are conducted in a manner that follows the procedures outlined in this plan and the Work Plan;
2. coordinate the sampling activities with the PM, QAO, and field personnel;
3. oversee the use, maintenance and operation of sampling equipment; and
4. report daily activities, problems, etc. to QAO and PM.

#### **C.2.3 Laboratory Personnel**

The laboratory will have its own project organization with responsibilities similar to that of the field operations personnel.

##### **C.2.3.1 Laboratory Director**

The Laboratory Director will be primarily responsible for the overall operation of the laboratory including all samples analyzed and data reported. The Laboratory Director will also be responsible for initiating corrective action measures when analytical data do not meet the requirements of this plan or the laboratory's QAPP.

## C.4.0 SAMPLING

### **C.4.1 General**

The purpose of this section is to detail the general sampling procedures that will be used to collect the data required to complete this project. The sampling efforts shall be uniform and follow specific protocols to be considered relevant to the project. Additional information is included in the EE/CA SSP.

### **C.4.2 General Sampling Procedures**

#### **C.4.2.1 Sample Containers and Preservatives**

Sample containers will consist of I-Chem 200 series (or equivalent) glass or plastic bottles and will be provided and prepared by the laboratory prior to sampling efforts. The laboratory will also provide any required preservatives. Table C.2 lists the containers, preservatives, and holding times for parameters that will be analyzed during this project.

#### **C.4.2.2 Sample Labeling**

All sample containers will be labeled at the time of sampling. Each label will be completed with the required information and then secured to the container with transparent packing tape to prevent accidental loss or damage. Required information on the sample label includes: project number, sample identification number, date, time, analyses, and sampler's initials. Also, any preservatives or special handling instructions will be clearly displayed on the label.

#### **C.4.2.3 Sample Identification Numbers**

A unique sample identification number will identify each sample collected for chemical analyses. This sample identification numbering system was developed to aid in data management and provide a consistent format for Geographic Information System (GIS) applications. These sample numbers include several key pieces of information for GIS such as the sample location, sample type/matrix, and the sampled depth interval or date sampled. The other fields are required for project management.

An example of a valid sample number for a soil sample follows:

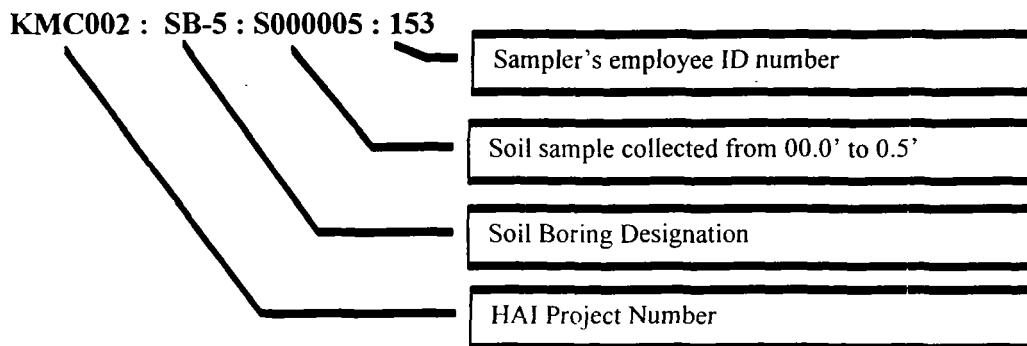


Table C.3 provides a summary of all matrices and their associated sample numbers.

#### **C.4.2.4 Sampling Equipment Preparation and Decontamination**

Sampling equipment to be reused will be thoroughly decontaminated between sampling locations and at the beginning and end of each day. To decontaminate the equipment it will be washed with a mild non-phosphatic soap and thoroughly rinsed with distilled water. HAI Standard Operating Procedure (SOP) No. F1000 (refer to Attachment A of the FSAP) provides a more detailed description of decontamination procedures. If complete cleaning of any piece of sampling equipment is not possible, then it will be discarded and replaced with a clean article.

#### **C.4.2.5 Sample Storage and Transportation**

Field samples will be placed in portable coolers on ice immediately following sample collection and remain on ice until being delivered to the laboratory. Ice will be double bagged to prevent leakage and possible water damage to samples, sample labels, and documentation. Any samples not placed on ice immediately upon collection will be discarded, and a new sample will be collected.

#### **C.4.2.6 Field Notes**

General field notes will be recorded in waterproof surveyors notebooks using indelible ink. In addition

to the field notebooks, certain activities will require the completion of data sheets. A Soil Boring Log (see Attachment B) will be completed for each soil boring/monitoring well installed. A Groundwater Monitoring Well Sampling Data Sheet (see Attachment B) must be completed for each monitoring well sampled. When weather conditions prohibit the completion of data sheets in the field, data may be recorded in field notebooks and then transferred to data sheets at the end of the day.

Additionally, a Daily Field Report (Attachment B) will be completed at the end of the day summarizing the day's activities and observations. Copies of the documentation will be forwarded to HAI's Dublin, Ohio office weekly. If copies of previous work are required, then arrangements will be made with the QAO.

Field notebooks, field data sheets, or daily field reports will not be obscured, destroyed, or discarded, even if it contains errors or is illegible. Corrections will be made by drawing a single line through the error and writing in the correct information. Corrections will be dated and initialed by the person making the correction.

#### **C.4.2.7 Chain-of-Custody**

The chain-of-custody is discussed in Section C.5.0 of this plan.

#### **C.4.2.8 Field Sampling Equipment List**

Table C.4 is a list of the general field sampling equipment that will be available on-site. The field analysis equipment will be calibrated in accordance with the manufacturer's recommendations and this plan.

#### **C.4.2.9 Sampling Quality Control**

Several sampling quality control measures will be necessary to assess the integrity of samples collected. These measures include the use of field blanks and trip blanks to locate possible sources of sample contamination.

The number of field blanks (e.g., equipment/rinseate blanks) analyzed for a class of compounds will be "equal to" ten percent of the total samples analyzed, for that class, with a minimum of one per day. Field blanks will be collected by running laboratory prepareddeionized water through sample collection equipment and preserved according to Table 2. Field blanks will be analyzed for the same parameters as the field samples. It is the samplers responsibility to collect the appropriate number of field blanks for the day's sampling efforts.

One trip blank per shipping container (e.g., cooler) will be required. Trip blanks are only necessary for samples requiring volatile organic analyses. Trip blanks will be prepared in the laboratory, prior to sampling efforts, using laboratory-prepareddeionized water and preserved using the same procedures as the samples. Trip blanks must accompany sample containers during sample collection and transportation. When sampling groundwater and surface water, a field duplicate sample will be collected. The minimum frequency of field duplicate sample collection is one per every ten investigative samples. It is required that a field duplicate be collected every day during groundwater sampling events. A new field duplicate will be required if the members of the sampling team change during the day.

#### C.4.3 Site-Specific Sampling Procedures

Site-specific sampling procedures are presented in the Field Sampling and Analysis Plan.

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### C.7.0 ANALYTICAL PROCEDURES

The analytical methods which will be employed in this project are summarized in Table C.5. Sediment samples collected from the manholes and stockpile will be submitted for parameters shown on Table C-6. All analytical procedures will be conducted in accordance with the specified U.S.EPA methods. In the event that additional procedures are deemed necessary, the appropriate modifications will be made to this QAPP by revision or addendum.

### **C.8.3 Data Reporting**

Data reporting will be in accordance with the appropriate U.S.EPA method used for analysis.

Laboratory reports shall, at a minimum, include the following:

1. narrative including statement of samples received, description and rationale for any deviations from approved methods/SOPs, summary of data quality, and documentation of any significant problems encountered during analysis;
2. documentation of laboratory events including dates of sample receipt, sample extraction, and sample analysis;
3. analytical data including results, detection limits, dilutions, etc.;
4. a summary of QA/QC results and supporting documentation;
5. a copy of the signed COC for samples submitted for analysis.

Laboratory reports should be signed by the laboratory's QAO and/or the laboratory director prior to being issued. Reports will be issued to HAI's QAO. Any draft reports should be clearly identified as such.

### **C.8.4 Data Validation**

Analytical data will be reviewed according to the laboratory's data validation procedures outlined in Attachment A. After passing internal data validation, the data will be reported to HAI's QAO. Data will be reviewed by HAI's QAO to determine that proper preservation, holding times, and sample analysis procedures have been followed and are clearly documented. Additionally, the analytical results will be reviewed and compared to previous data, if any. Any questions regarding the data reports will be brought to the laboratory project manager's attention.

Additional data validation will be performed by an independent third-party datavalidator For this project third-party data validation will be conducted by Environmental Standards, Inc. The analytical laboratory is required to address any comments and correct any deficiencies identified in the data validation report.

## C.15.0 REFERENCES

A variety of technical manuals, administrative documents, and publications were referred to in preparing this document. Some of the references consulted are presented below. Referenced documents and publications may or may not have been reviewed in their entirety. The guidelines and procedures presented in the documents and publications referenced have not been strictly adhered to unless stated otherwise.

U.S.EPA. Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans. EPA/600/4-83-004. February 1983.

U.S.EPA. Data Quality Objectives for Remedial Response Activities: Development Process. EPA/540/6-87/003. March 1987.

U.S.EPA. Data Quality Objectives for Remedial Response Activities: Example Scenario. EPA/540/6-87/004. March 1987.

U.S.EPA. A Compendium of Superfund Field Operations Methods. EPA/540/P-87/001. December 1987.

U.S.EPA. Test Methods for Evaluating Solid Waste, Physical/Chemical Methods. SW-846, 3rd Edition. September 1986.

U.S.EPA. Methods for Chemical Analysis of Water and Wastes. EPA/600/4-79-020. March 1983.

U.S.EPA. Quality Assurance/ Quality Control Guidance for Removal Activities. EPA/540/G-90/004. April 1990. U.S.EPA Removal Program Representative Sampling Guidance, Volume 1, Soil. OSWER Directive 9630.4-10. November 1991.

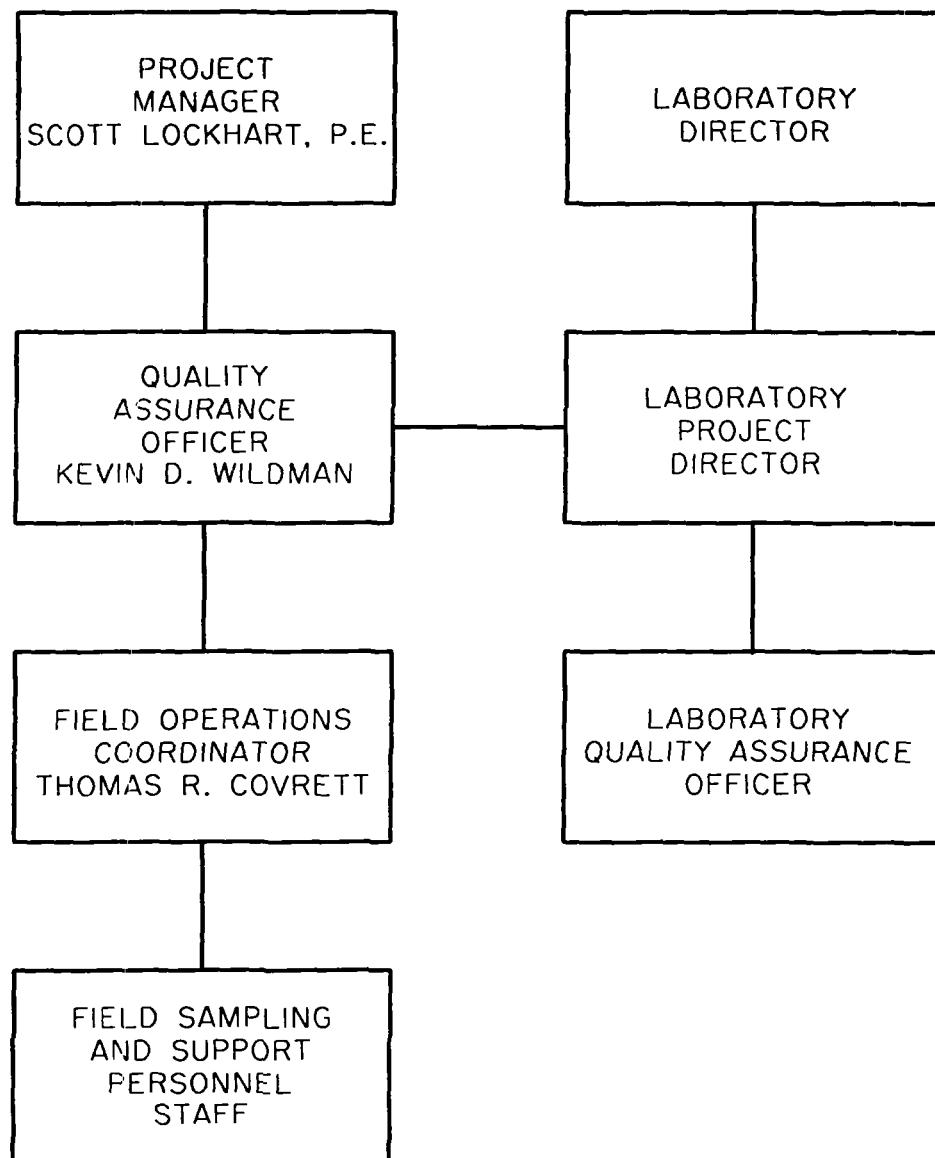


FIGURE CI

Hull & Associates, Inc. TOLEDO, OHIO
KERR-MCGEE CHEMICAL, LLC. TOLEDO TIE TREATMENT SITE
<b>PROJECT ORGANIZATION CHART</b>
CITY OF TOLEDO, LUCAS CO., OHIO

DATE:  
FEB. 1998 (REVISED JAN. 2000)

KMC002

**Quality Assurance Project Plan  
Toledo Tie Treatment Site**

**Table C.1**

**Parameter List**

<b>U.S. EPA Method</b>	<b>Parameters</b>
8260 (VOCs)	Benzene Toluene Ethylbenzene m/p Xylene o-Xylene Styrene Isopropylbenzene n-Propylbenzene 1,3,5-Trimethylbenzene tert-Butlybenzene 1,2,4-Trimethylbenzene sec-Butylbenzene p-Isopropylbenzene n-Butylbenzene
8270 (SVOCs)	2-methylphenol 3- or 4-methylphenol phenol 2,4-dimethylphenol 2-methylnaphthalene naphthalene acenaphthene acenaphthylene dibenzofuran fluorene anthracene benzo (a) anthracene benzo (b) fluoranthene benzo (k) fluoranthene benzo (ghi) perylene benzo (a) pyrene chrysene dibenz (a,h) anthracene

**Quality Assurance Project Plan  
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**Table C.1**

**Parameter List**

<b>U.S. EPA Method</b>	<b>Parameters</b>
8270 (SVOCs) cont.	fluoranthene indeno (1,2,3-cd) pyrene phenanthrene pyrene carbazole
7470 (Inorganics/Metals)	Arsenic Barium Cadmium Chromium Copper Lead Mercury Selenium Silver Zinc

**Quality Assurance Project Plan**  
**Toledo Tie Treatment Site**

**Table C.2**

**Sample Containers and Preservation**

<b>Parameter</b>	<b>Containers</b>	<b>Preservatives/ Max Holding Time</b>
VOCs (8260)	Soils - three Encore™ samplers Aqueous - three 40 ml Vials	Cool 4°C / 48 hrs / 14 days HCl pH > 2 / 14 days
SVOCs (8270)	Soils - one 8oz. wide mouth jar. Aqueous - three 1 liter bottles.	Cool 4°C / 10 (40) days <sup>1</sup> Cool 4°C / 5 (40) days <sup>1</sup>
Metals (6000/7000)	Soils - one 8 oz. wide mouth jar Aqueous - 250 ml plastic	Cool 4°C HNO <sub>3</sub> pH > 2
Total Organic Carbon (Walkley-Black)	Soils - one 4 oz. Wide mouth jar	Cool 4 °C
Total Chloride	Soils – one 4 oz. Wide mouth jar	Cool 4 °C
TCLP (1311)	Soils - two 8 oz. wide mouth jar Aqueous - three 1 liter bottles.	Cool 4°C Cool 4°C
Reactive sulfide	Soils - one 4 oz. wide mouth jar Aqueous - 250 ml plastic	Cool 4°C Cool 4°C
Reactive cyanide	Soils - one 4 oz. wide mouth jar Aqueous - 250 ml plastic	Cool 4°C Cool 4°C
pH (150.1)	Soils - one 2 oz. wide mouth jar Aqueous - 250 ml plastic	Cool 4°C Cool 4°C
Flash point (1010)	Soils - one 2 oz. wide mouth jar Aqueous - 250 ml plastic	Cool 4°C Cool 4°C
Total Organic Halogen (9020)	Soils – one 4 oz. wide mouth jar	Cool 4°C

Note:

All holding times are from time of sample collection. This list represents typical sample containers that may be supplied for this project. The contracted laboratory will provide a detailed sheet describing the types and number of containers sent for each analysis with each sample kit. The actual number of containers may be less as several parameters may be combined into a single container. The laboratory will also provide any required preservatives and instructions for preservation. If pre-preserved bottles are supplied, they will be clearly identified on the sampling container.

<sup>1</sup>5 or 10 days pre-extraction / 40 days post extraction

**Quality Assurance Project Plan**  
**Toledo Tie Treatment Site**

**Table C.3**

**Sample Types and Codes**

<b>Project #</b>	<b>Sample Location</b>	<b>Sample Type</b>	<b>Sample Depth/Date</b>	<b>Employee</b>	<b>Comments</b>
KMC002	SB-13	S	005020	: 289	Soil sample collected from SB-13 at depth of 0.5' to 2.0'
KMC002	MW-2	G	011700	: 289	Groundwater sample collected from MW-2 on January 17, 2000
KMC002	SW-3	W	011700	: 289	Surface water sample collected from SW-3 on January 17, 2000
KMC002	SED-1	D	000005	: 289	Sediment sample collected from SED-1 at a depth of 0.0' to 0.5 feet
KMC002	AS-2	A	011700	: 289	Air sample collected from AS-2 on January 17, 2000
KMC002	FB1	W	011700	: 289	Field Blank number 1 collected on January 17, 2000
KMC002	TB1	W	011700	:	Trip Blank number 1 submitted with samples on January 17, 2000. No employee number included in sample number as sample is prepared in the laboratory.

**Quality Assurance Project Plan  
Toledo Tie Treatment Site**

**Table C.4**

**Field Equipment List**

1. Visqueen
2. non-phosphatic soap
3. Distilled water
4. Trash bags
5. Analytical containers
6. Shipping containers/coolers
7. Ice
8. Indelible ink pens
9. Clear packing tape
10. Health and safety equipment
11. Decon supplies
12. Tools

Note: This represents a general list of sampling equipment required for this project. Additional equipment required for specific tasks is presented in the FSAP.

**Quality Assurance Project Plan  
Toledo Tie Treatment Site**

**Table C.5**

**Analytical Procedures**

<b>U.S. EPA Methods</b>	<b>Parameters</b>
1311 - 8240	TCLP volatiles
1311 - 8270	TCLP semi-volatiles
1311 - 8080 & 8150	TCLP pesticides/herbicides
1311 - 6000/7000 series	TCLP metals
1010	flash point
150.1	pH
SW-846 Section 7.3.3.2	reactive cyanide
SW-846 Section 7.3.4.1	reactive sulfide
6000/7000 series	metals
8260	volatile organics
Walkley-Black	Total Organic Carbon
9252	Chloride
8270	semi volatile organic
9020	Total Organic Halogen

**Quality Assurance Project Plan  
Toledo Tie Treatment Site**

**Table C.6**

**Parameter List**

<b>U.S. EPA Method</b>	<b>Parameters</b>
8260 (VOCs)	1,1-Dichloroethene Chloromethane Bromomethane Vinyl Chloride Chloroethane Acrolein Acrylonitrile Methylene Chloride Trichlorofluoromethane 1,1-Dichloroethane Chloroform 1,2-Dichloroethane 1,1,1-Trichloroethane Dichlorodifluoromethane Methyl Iodide Acetonitrile Acetone Carbon Disulfide Propionitrile Allyl Chloride Methacrylonitrile 2-Butanone Dibromomethane 1,4-Dioxane trans-1,2-Dichloroethene cis-1,2-Dichloroethene Trichloroethene Benzene Toluene Chlorobenzene Xylene (total) Carbon Tetrachloride Bromodichloromethane 1,1,2,2-Tetrachloroethane

**Quality Assurance Project Plan  
Toledo Tie Treatment Site**

**Table C.6**

**Parameter List**

<b><u>U.S. EPA Method</u></b>	<b><u>Parameters</u></b>
8260 (VOCs) cont.	1,2-Dichloropropane trans-1,3-Dichloropropene Dibromochloromethane 1,1,2-Trichloroethane cis-1,3-Dichloropropene Bromoform Tetrachloroethene Ethylbenzene Isobutyl Alcohol Vinyl Acetate 2-Chloro-1,3-butadiene 1,2-Dibromoethane Methyl Methacrylate 1,1,1,2-Tetrachloroethane tans-1,4-Dichloro-2butene 1,2,3-Trichloropropane 2-Hexanone 4-Methyl-2-pentanone Ethyl Methacrylate Pentachloroethane 1,2-Dibromo-3 chloropropane Styrene
8270 (SVOCs)	aniline acetophenone bis(2chloroisopropyl)ether ethyl methanesulfonate methyl methanesulfonate N-nitrosodiethylamine N-nitrosomethylmethylethylamine N-nitrosomorpholine N-nitrosopiperidine N-nitrosopyrrolidine 2-picoline

**Quality Assurance Project Plan  
Toledo Tie Treatment Site**

**Table C.6**

**Parameter List**

<b><u>U.S. EPA Method</u></b>	<b><u>Parameters</u></b>
8270 (SVOCs) cont.	o-toluidine benzyl alcohol bis (2-chloroethoxy) methane bis (2-chloroethyl) ether 2-chlorophenol 2-methylphenol 3- or 4-methylphenol 1,2-dichlorobenzene 1,3-dichlorobenzene 1,4-dichlorobenzene hexachloroethane isophorone nitrobenzene 2-nitrophenol N-nitrosodi-methylamine N-nitrosodi-n-propylamine phenol pyridine 2,6-dichlorophenol 1,3-dinitrobenzene hexachloropropene isosafrole 1,4-naphthoquinone N-nitrosodi-n-butylamine 1,4-phenylenediamine safrole 1,2,4,5-tetrachlorobenzene O,O,O- triethylphosphorothioate a,a-dimethylphenethylamine 4-chloroaniline 4-chloro-3-methylphenol 2-chloronaphthalene 2,4-dichlorophenol 2,4-dimethylphenol

**Quality Assurance Project Plan  
Toledo Tie Treatment Site**

**Table C.6**

**Parameter List**

<b><u>U.S. EPA Method</u></b>	<b><u>Parameters</u></b>
8270 (SVOCs) cont.	dimethyl phthalate 2,6-dinitrotoluene hexachlorobutadiene hexachlorocyclopentadiene 2-methylnaphthalene naphthalene 2-nitroaniline 1,2,4-trichlorobenzene 2,4,5-trichlorophenol 2,4,6-trichlorophenol 2,3,4,6-Tetrachlorophenol dimethoate 1-naphthylamine 2-naphthylamine 5-nitro-o-toluidine pentachlorobenzene phenacetin tetraethylthiopyrophosphate 1,3,5-trinitrobenzene diallate (trans/cis) acenaphthene acenaphthylene 4-bromophenyl phenyl ether) 4-chlorophenyl phenyl ether dibenzofuran diethyl phthalate 4,6-dinitro-2-methylphenol 2,4-dinitrophenol 2,4-dinitrotoluene fluorene hexachlorobenzene 3-nitroaniline 4-nitroaniline 4-nitrophenol N-nitrosodiphenylamine 2-acetylaminofluorene

**Quality Assurance Project Plan  
Toledo Tie Treatment Site**

**Table C.6**

**Parameter List**

<b><u>U.S. EPA Method</u></b>	<b><u>Parameters</u></b>
8270 (SVOCs) cont.	4-aminobiphenyl chlorobenzilate p-(dimethylamino)azobenzene 7,12-dimethylbenz(a)anthracene 3,3'-dimethylbenzidine isodrin 3-methylcholanthrene 4-nitroquinoline-1-oxide pentachloronitrobenzene pronamide methapyrilene thionazin anthracene benzo (a) anthracene benzo (b) fluoranthene benzo (k) fluoranthene benzo (ghi) perylene benzo (a) pyrene bis (2-ethylhexyl) phthalate butyl benzyl phthalate chrysene di-n-butyl phthalate dibenz (a,h) anthracene 3,3'-dichlorobenzidine di-n-octyl phthalate fluoranthene indeno (1,2,3-cd) pyrene pentachlorophenol phenanthrene pyrene carbazole

**Quality Assurance Project Plan  
Toledo Tie Treatment Site**

**Table C.6**

**Parameter List**

<b><u>U.S. EPA Method</u></b>	<b><u>Parameters</u></b>
8080 (PCBs)	PCB 1016 PCB 1221 PCB 1232 PCB-1242 PCB-1248 PCB-1254 PCB-1260
7470 (Inorganics/Metals)	Arsenic Barium Cadmium Chromium Copper Lead Mercury Selenium Silver Zinc

**ATTACHMENT A**

**LANCASTER LABORATORIES' QUALITY ASSURANCE PLAN**

## LABORATORY QUALITY ASSURANCE PLAN

OCTOBER 9, 1990  
REVISED: June 25, 1999

**WARNING:** The information contained herein is of a highly confidential and proprietary nature. Lancaster Laboratories specifically prohibits the dissemination or transfer of this information to any person or organization not directly affiliated with the project for which it was prepared.



Section No. 1  
Revision No. 7  
Date: 06/25/99  
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## 1. Laboratory Quality Assurance Plan

This document provides the laboratory portion of the response to EPA's *Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans* QAMS-005/80, Sections 5.1 through 5.16 as revised December 29, 1980, and EPA-600/4-83-004, February 1983. Guidance was also obtained from *Preparation Aids for the Development of Category 1 Quality Assurance Project Plans*, Office of Research and Development, USEPA, EPA/600/8-91/003, February 1991.

As much as possible, the procedures in this document have been standardized to make them applicable to all types of environmental monitoring and measurement projects. However, under certain site-specific conditions, all of the procedures discussed in this document may not be appropriate. In such cases it will be necessary to adapt the procedures to the specific conditions of the investigation.

Quality Assurance Officer:

A handwritten signature in black ink, appearing to read "Stephen M. Lewand". The signature is fluid and cursive, with some upward strokes and a final flourish.

	<u>Section</u>	<u>Pages</u>	<u>Revision</u>	<u>Date</u>
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3.	Project Description	1	5	04/27/98
4.	Project Organization and Responsibility	4	5	04/27/98
5.	QA Objectives for Measurement Data, in terms of precision, accuracy, completeness, representativeness, and comparability	4	4	04/27/98
6.	Sampling Procedures	3	4	04/27/98
7.	Sample Custody	32	5	04/27/98
8.	Calibration Procedures and Frequency	6	5	04/27/98
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11.	Internal Quality Control Checks	28	5	04/27/98
12.	Performance and Systems Audits	10	7	06/25/99
13.	Preventive Maintenance	3	4	04/27/98
14.	Specific Routine Procedures Used to Assess Data Precision, Accuracy, and Completeness	4	5	04/27/98
15.	Corrective Action	3	4	04/27/98
16.	Quality Assurance Reports to Management	1	3	07/24/95
	Appendix A - Example Reporting Forms	80	5	04/27/98

### **3. Project Description**

This quality assurance project plan provides specific quality assurance and quality control procedures involved in the generation of data of acceptable quality and completeness. Tests will be performed according to the analytical methodology set forth in the USEPA SW-846 3rd Edition, Update III, 1996. SW-846 provides specific analytical procedures to be used and defines the specific application of these procedures. Proven instruments and techniques will be used to identify and measure the concentrations of volatiles, semivolatiles, and pesticide compounds and/or the inorganic elements. The laboratory will employ state-of-the-art GC/MS and/or GC procedures to perform all organic analyses, including all necessary preparation for analysis. Inorganic analyses will be performed using graphite furnace atomic absorption spectrophotometry (AA), inductively coupled plasma spectroscopy, cold vapor AA, flame AA, or hydride generation AA. Wet chemical analyses will use appropriate instrumentation. The client is responsible for providing specifics on the project site.

\**Test Methods for Evaluating Solid Waste - Physical/Chemical Methods*, SW-846, 3rd Edition, Update III, December 1996.

#### **4. Project Organization**

The objectives of the laboratory Quality Assurance Program are to establish procedures which will ensure that data generated in the laboratory are within acceptable limits of accuracy and precision, to ensure that quality control measures are being carried out, and to ensure accountability of the data through sample and data management procedures. To this end, a Quality Assurance Department has been established. The Quality Assurance Officer reports directly to the President of Lancaster Laboratories and has no direct responsibilities for data production, thus avoiding any conflict of interest.

The attached organizational charts show key managerial personnel. Resumes of key individuals may be found in the enclosed *Qualifications Manual*.

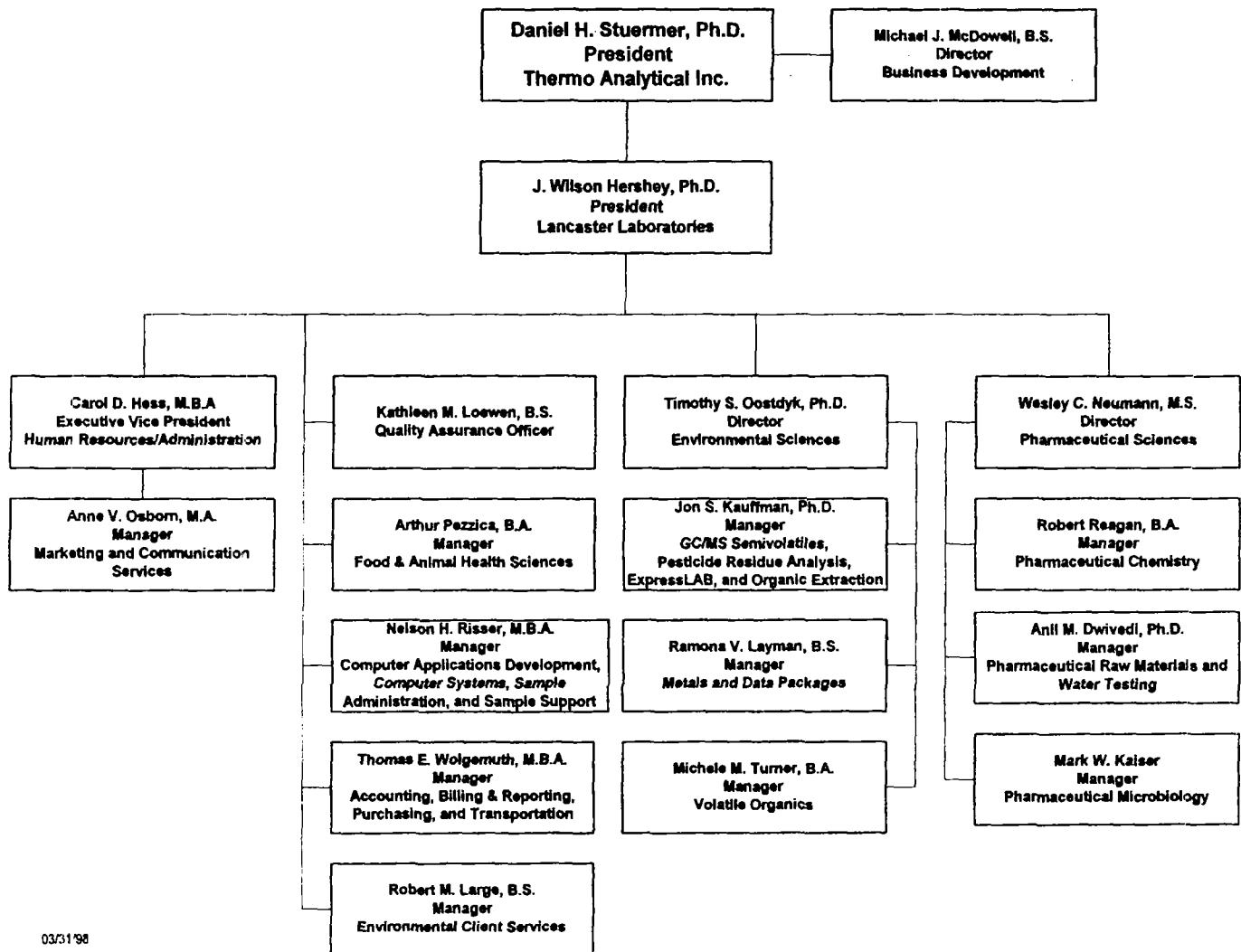
The Sample Administration Group will be responsible for receiving samples, signing the external chain of custody, checking sample condition, assigning unique laboratory sample identification numbers, and initiating internal chain-of-custody forms. Sample Support personnel will be responsible for assigning storage locations, checking and adjusting preservation, homogenizing the sample as needed, and sample discard.

Group leaders listed in each technical area are responsible for performing laboratory analyses, quality control as specified in the methods, instrument calibration, and technical data review. Data is reported using a computerized sample management system, which tracks sample progress through the laboratory and generates client reports when all analyses are complete. Quality control data is entered onto the same system for purposes of charting and monitoring data quality.

The Quality Assurance Department is responsible for reviewing quality control data, conducting audits in the laboratory and reporting findings to management, maintaining current copies of all analytical methods, maintaining copies of computer code used to calculate and report results, submitting blind samples to the laboratory, and ensuring that appropriate corrective action is taken when quality problems are observed.

Data package deliverables are available upon request. The Quality Assurance Department reviews the contents of the deliverables for completeness and to be sure that all quality control checks were performed and met specifications. This step includes review of holding times, calibrations, instrument tuning, blank results, duplicate results, matrix spike results, surrogate results, and laboratory control samples (where applicable). Every attempt to meet specifications will be made, and any item outside of the specifications will be noted in the narrative. The laboratory will not validate data with regard to usability since this generally requires specific knowledge about the site.

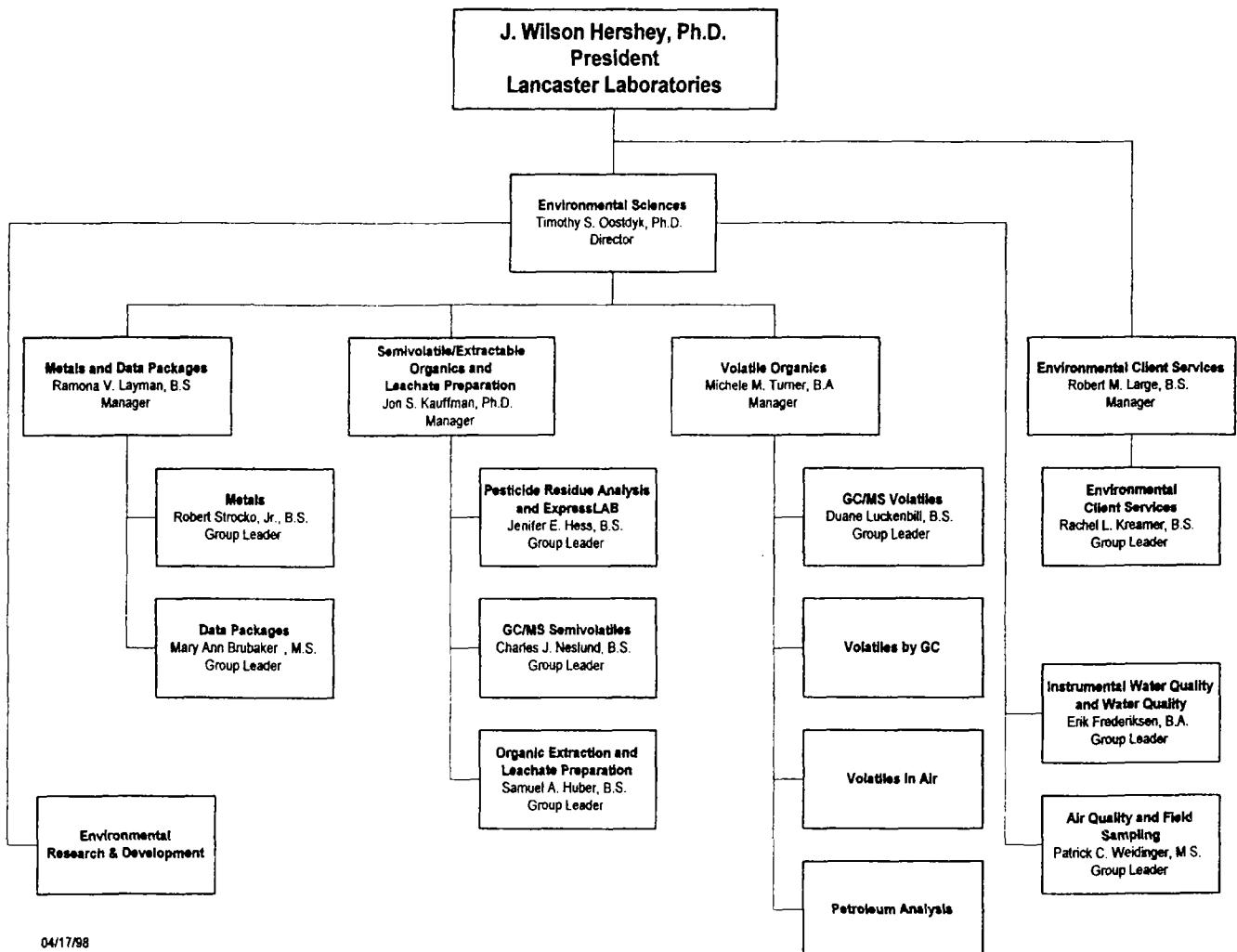
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## Environmental Sciences



## **5. QA Objectives for Measurement Data**

Quality assurance is the overall program for assuring reliability of monitoring and measurement data. Quality control is the routine application of procedures for obtaining set standards of performance in the monitoring and measurement process. Data quality requirements are based on the intended use of the data, the measurement process, and the availability of resources. The quality of all data generated and processed during this investigation will be assessed for precision, accuracy, representativeness, comparability, and completeness. These specifications will be met through precision and accuracy criteria as specified in Section 11. Detection limits are presented in Section 9.

Precision - Precision is determined by measuring the agreement among individual measurements of the same property, under similar conditions. The laboratory objective is to equal or exceed the precision demonstrated for the applied analytical method on comparable samples. The degree of agreement is expressed as the relative percent difference (RPD%). Evaluation of the RPD% is based on statistical evaluation of past lab data or guidelines within the methods for organic and inorganic analyses. External evaluation of precision is accomplished by analysis of standard reference material and interlaboratory performance data.

Accuracy - Accuracy is a measure of the closeness of an individual measurement to the true or expected value. Analyzing a reference material of known concentration or reanalyzing a sample which has been spiked with a known concentration/amount is a way to determine accuracy. Accuracy is expressed as a percent recovery (%R). Evaluation of the %R is based on statistical evaluation of past lab data or guidelines within the methods for organic and inorganic analyses.

Representativeness - Representativeness expresses the degree to which data accurately represents the media and conditions being measured. The representativeness of the data from the sampling site will depend on the sampling procedure. Sample collection is the responsibility of the client. Samples will be

homogenized, if required, as part of the laboratory sample preparation. By comparing the quality control data for the samples against other data for similar samples analyzed at the same time, representativeness can be determined for this objective.

Comparability - Comparability conveys the confidence with which one set of data can be compared to another. The analytical results can be compared to other laboratories by using traceable standards and standard methodology and consistent reporting units. The Laboratory Quality Assurance Program documents internal performance, and the interlaboratory studies document performance compared to other laboratories.

Completeness - Completeness is a measure of the quantity of valid data acquired from a measurement process compared to the amount that was expected to be acquired under the measurement conditions. The completeness of an analysis can be documented by including in the data deliverables sufficient information to allow the data user to assess the quality of the results. Additional information will be stored in the laboratories archives, both hard copy and magnetic tape. Quality Assurance standard operating procedures (SOPs) are in place to provide traceability of all reported results.

To ensure attainment of the quality assurance objectives, SOPs are in place detailing the requirements for the correct performance of laboratory procedures. The laboratory SOPs fall under five general categories:

1. Corporate policy
2. Quality assurance
3. Sample administration
4. General laboratory procedures
5. Analytical (i.e., methods, standard preps., instrumentation)

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All SOPs are approved by the QA Department prior to implementation. The distribution of current SOPs and archiving of outdated ones are controlled through a master file. Table 5-1 provides an index of QA SOPs in place in support of the Quality Assurance objectives. These requirements are supplemented by the procedures in the laboratory and analytical SOPs.

**Table 5-1**

Document #	Document Title
QA-101	Sample Collection
QA-102	Sample Log-in
QA-103	Sample Storage and Discard
QA-104	Internal Chain-of-Custody Documentation
QA-105	Analytical Methods Manual
QA-106	Validation and Authorization of Analytical Methods
QA-107	Analytical Methods for Nonstandard Analyses
QA-108	Subcontracting to Other Laboratories
QA-109	Laboratory Notebooks, Logbooks, and Documentation
QA-110	Reagents
QA-111	Instrument and Equipment Calibration
QA-112	Instrument and Equipment Maintenance
QA-113	Data Entry, Verification, and Reporting of Results for the Computerized Sample Management System (CSMS)
QA-114	Data Storage, Security, and Archiving
QA-115	Quality Control Records
QA-116	Investigation and Corrective Action of Unacceptable Quality Control Data
QA-117	Personnel Training Records and Curriculum Vitae
QA-118	Quality Assurance Audits
QA-119	Proficiency Samples
QA-120	Documentation of Programming for the Sample Management System
QA-121	Quality Assurance Guidelines for Computers and Computerized Systems
QA-122	Investigation and Corrective Action Reporting for Laboratory Problems
QA-123	Missed Holding Time Reports
QA-124	External Audits
QA-125	Document Control
QA-126	Qualification and Validation Documentation for Laboratory Instrumentation and Equipment
QA-127	Handling of Client Technical Complaints (Investigations and Response)
QA-128	Compliance with Good Laboratory Practice (GLP) Regulations

## **6. Sampling Procedures**

In order for meaningful analytical data to be produced, the samples analyzed must be representative of the system from which they are drawn. It is the responsibility of the client to ensure that the samples are collected according to accepted or standard sampling methods.

The laboratory will provide the appropriate sample containers, required preservative, chain-of-custody forms, shipping containers, labels, and seals. The majority of sample containers are purchased precleaned by the supplier. Any reused bottles are cleaned in-house following laboratory standard operating procedures. Special containers with traceability documentation are available upon request. Because the laboratory does not stock this type of container, 1 month prior notice is required.

Each lot of preservative will be documented and checked for contaminants before use. The appropriate bottle will be preserved with the new preservative and filled with deionized water to represent a sample. A similar container (that does not contain preservative) will be filled with deionized water to be used as a blank check. Analysis results are documented for each preservative lot number.

Trip blanks will be prepared by the laboratory and accompany sample containers at the project required frequency. Analyte free water will also be provided for field blanks.

A list of containers, preservatives, and holding times follows in Table 6-1.

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Table 6-1

Sample Containers, Preservatives, and  
 Holding Times for Aqueous and Solid Samples

Fraction	Vol. Req. (mL) Wt. Req. (g)	Container P=Plastic G=Glass	Preservation <sup>a</sup>	Holding Time <sup>d</sup> From Date of Collection	Water	Soil
Volatiles	<u>3 x 40 mL</u> 100 g <sup>f</sup>	G	Cool, 4°C <sup>b</sup> pH <2 w/HCl	14 Days	14	
Pesticides	<u>2 x 1000 mL</u> 100 g	G	Cool, 4°C <sup>b</sup>	7 Days to extraction	14	
Herbicides	<u>2 x 1000 mL</u> 100 g	G	Cool, 4°C <sup>b</sup>	7 Days to extraction	14	
Halocarbons	<u>3 x 40 mL</u> 100 g <sup>f</sup>	G	Cool, 4°C <sup>b</sup> pH <2 w/ HCl <sup>c</sup>	14 Days	14	
Aromatics	<u>3 x 40 mL</u> 100 g <sup>f</sup>	G	Cool, 4°C <sup>b</sup> pH <2 w/ HCl	14 Days	14	
Semivolatiles (Acid/Base Neutrals)	<u>3 x 1000 mL</u> 100 g	G	Cool, 4°C <sup>b</sup>	7 Days to extraction	14	
PAHs (HPLC)	<u>2 x 1000 mL</u> 100 g	G	Cool, 4°C Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub>	7 Days to extraction	14	
Metals	<u>1000 mL</u> 100 g	P,G	HNO <sub>3</sub> to pH <2	6 Months Hg 28 days	6	
Cyanide	<u>5000 mL</u> 100 g	P,G	Cool, 4°C NaOH to pH >12 ascorbic acid	14 Days	14	
Sulfide	<u>500 mL</u> 100 g	G	Cool, 4°C (NaOH, ZnAC Waters Only)	7 Days	7	
Phenol	<u>1000 mL</u> 100 g	G	Cool, 4°C H <sub>2</sub> SO <sub>4</sub> to pH <2	28 Days	28	
TPH	<u>2 x 1000 mL</u> 100 g	G	Cool, 4°C pH <2 w/ HCl	7 Days	14	
TPH-GRO	<u>3 x 40 mL</u> 100 g	G	Cool, 4°C pH <2 w/ HCl	14 Days to extraction	14	
TPH-DRO	<u>2 x 1000 mL</u> 200 g	G	Cool, 4°C <2 with HCl	7 Days	14	
TOX	<u>4 x 250 mL</u> 50 g	G	Cool, 4°C H <sub>2</sub> SO <sub>4</sub> to pH <2, Na <sub>2</sub> SO <sub>3</sub>	28 Days	N/A	
TOC	<u>125 mL</u> 20 g	G	Cool, 4°C H <sub>2</sub> SO <sub>4</sub> to pH <2	28 Days	28	

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<sup>a</sup>pH Adjustment with acid/base is performed on water samples only.

<sup>b</sup>Sodium thiosulfate needed for chlorinated water samples

<sup>c</sup>Due to the inaccurate recovery of 2-chloroethyl vinyl ether in the presence of HCl, Halocarbon samples analyzed for this compound should not be preserved.

<sup>d</sup>Samples will be analyzed as soon as possible after collection. The times listed are the maximum times that samples will be held before analysis and still be considered valid.

<sup>e</sup>Analysis 40 days from extraction.

<sup>f</sup>This is for soils not sampled by Method 5035. For Method 5035, see below.

**NOTE:** For volatiles analysis, the container should be filled completely, with no headspace. **All sample containers, preservatives, and mailers will be supplied at no additional charge upon request, except for the special containers with traceability documentation. There is an additional charge for this type of container.**

#### Method 5035

##### Containers for sampling soils for volatile organic compounds

Analysis Level	Option #	EnCore™ Sampler	Methanol Preserved 40-mL Vial	Unpreserved Container for Moisture	Travel Blank
Low	A	3 (7*)	—	1	Water
High	B	1 (3*)	—	1	Water
	C	—	1 (3*)	1	Methanol

\*Total number of sampled containers needed for background/MS/MSD analyses. Because only one analysis will come from each container, additional samples must be collected for matrix spikes/matrix spike duplicate analyses or other quality control analyses. The number of containers for MS/MSD samples is listed above.

## 7. Sample Custody

Samples are unpacked and inspected in the sample receipt area. At this time, the samples are examined for breakage and agreement with the associated client paperwork. The cooler temperatures will be checked upon receipt and recorded. As the samples are unpacked, the sample label information will be compared to the chain-of-custody record and any discrepancies or missing information will be documented. If necessary, the cooler will be closed and placed in cold storage until instructions and resolution of any discrepancies are received from the client.

A member of our Sample Administration Group will act as sample custodian for the project. To ensure accountability of our results, a unique identification number is assigned to each sample as soon as possible after receipt at the laboratory. When samples requiring preservation by either acid or base are received at the laboratory, the pH will be measured and documented, with the exception of samples designated for volatile analysis. Samples requiring refrigeration will be stored in our walk-in cooler which is maintained at 2° to 4°C. The use of our computer system in tracking samples (by the Lancaster Labs sample number assignment) will control custody of the sample from receipt until the time of its disposal. The security system on our laboratory building allows us to designate the entire facility as a secure area since all exterior doors are either locked or attended. Therefore, hand-to-hand chain of custody is not part of our routine procedure, but is available upon request. If requested, hand-to-hand chain of custody will be provided as per attached SOP-QA-104, "Chain-of-Custody Documentation." The laboratory chain of custody will begin with the preparation of bottles. The procedures for sample log-in, storage, and chain-of-custody documentation are detailed in the QA standard operating procedures included in Section No. 7 (SOP-QA-102, SOP-QA-103, and SOP-QA-104). Examples of sample labels and a custody seal are shown in Figure 7.1.

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Figure 7-1

**CLIENT**

If you do not have an account with us,  
results will not be released until payment is received.

**SAMPLE IDENTIFICATION / LOCATION**

CL. RES:

**COLLECTION INFORMATION**

- COMPOSITE  
 GRAB

DATE                    TIME                    BY:

**TESTING REQUIRED**

**PRESERVATIVE(S) ADDED**



**Lancaster Laboratories**

2425 New Holland Pike, Lancaster, PA 17601-5994

LL#

**Sample Label (Field)**

00649-ABC MANUFACTURING, INC.  
FM-4 GRAB WATER SAMPLE  
SEMI-ANNUAL MONITORING PROJECT  
COLLECTED ON 10/17/92 AT 1525 BY FRB  
0219 0220 0516 1126

**Sample Label (Laboratory)**



**CUSTODY SEAL**

2425 New Holland Pike, Lancaster, PA 17601-5994 (717) 656-2301

DATE: \_\_\_\_\_

SIGNATURE: \_\_\_\_\_

**Laboratory Custody Seal**















































# Analysis Request/ Environmental Services Chain of Custody



For Lancaster Laboratories use only  
Acct. # \_\_\_\_\_ Sample # \_\_\_\_\_

Please print. Instructions on reverse side correspond with circled numbers.

Client: _____		Acct. #: _____	Matrix: <input checked="" type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7 <input type="radio"/> 8 <input type="radio"/> 9 <input type="radio"/> 10 <input type="radio"/> 11 <input type="radio"/> 12 <input type="radio"/> 13 <input type="radio"/> 14 <input type="radio"/> 15 <input type="radio"/> 16 <input type="radio"/> 17 <input type="radio"/> 18 <input type="radio"/> 19 <input type="radio"/> 20 <input type="radio"/> 21 <input type="radio"/> 22 <input type="radio"/> 23 <input type="radio"/> 24 <input type="radio"/> 25 <input type="radio"/> 26 <input type="radio"/> 27 <input type="radio"/> 28 <input type="radio"/> 29 <input type="radio"/> 30 <input type="radio"/> 31 <input type="radio"/> 32 <input type="radio"/> 33 <input type="radio"/> 34 <input type="radio"/> 35 <input type="radio"/> 36 <input type="radio"/> 37 <input type="radio"/> 38 <input 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## DIRECTIONS FOR COMPLETING THIS FORM

- (1) Client: Your company's name  
 Acct. #: Your account number with Lancaster Laboratories
- Project Name/#: The way your company refers to the work involved with these samples. You may want to include project location as part of the description.
- PWSID: Potable Water Source ID#
- Project Manager: The person at your company responsible for overseeing the project
- P.O. #: Your company's purchase order number
- Sampler: The name of the person who collected the samples
- Quote #: The reference number that appears on your quote (if Lancaster Laboratories gave you a number)
- State where sample was collected: Please indicate where the sample was taken, e.g., Pa., N.J., etc.
- (2) Sample Identification: The unique sample description you want to appear on the analytical report
- Date Collected/Time Collected: When the sample was collected
- (3) Grab: Check here if sample was taken at one time from a single spot.  
 Composite: Check here if samples were taken from more than one spot, or periodically, and combined to make one sample.
- (4) Matrix: Check the type of sample you are submitting. If it is a water sample, please indicate if it is a potable water or if it is an NPDES sample.
- Number of Containers: Indicate the total number of containers for each sampling point.
- (5) Analyses Requested: Write the name of each analysis (or an abbreviation of it) here, and use the catalog number that appears at the beginning of each line in the Schedule of Services. Be sure to indicate which analyses are to be performed on which samples.
- (6) Remarks: List special instructions about the sample here (e.g., hazardous elements, high levels of analyte, etc.). The space can also be used (if needed) for listing additional analyses.
- (7) Turnaround time Requested: Circle Normal if you want routine TAT, which is usually within 10-15 days. If you need your results faster, call ahead to schedule Rush work.  
 Rush Results Requested by: Circle Fax or Phone and include the number.
- (8) Data Package Options: Call our Client Services Group (717-656-2301) if you have questions about these choices.  
 SDG Complete? Indicate Yes if this is a complete sample delivery group or No if you will be submitting additional samples to be included in the same data package.  
 Note: We need to have one quality control (QC) sample for every 20 samples you send, if you are requesting site-specific QC. Please give us this sample in triplicate volume and identify it by writing "QC" in the Remarks column.  
 The internal chain of custody is a hand-to-hand documentation recording a sample's movement throughout the company. We routinely start a chain of custody for data-package samples unless we are told otherwise. There is a \$25 per sample charge for the chain-of-custody documentation.
- (9) Relinquished by/Received by: The form must be signed each time the sample changes hands. We can supply chain-of-custody seals for the outside of your packages if you require them.

Thank you for using Lancaster Laboratories.  
 Please call our Client Services Group (717-656-2301) if you have any questions about completing this form.

**Figure 1 - Continued**

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## **8. Calibration Procedures**

Procedures for initial calibration and continuing calibration verification are in place for all instruments within the laboratory. The calibrations generally involve checking instrument response to standards for each target compound to be analyzed. The source and accuracy of standards used for this purpose are integral to obtaining the best quality data. Standards used at Lancaster Laboratories are purchased from commercial supply houses either as neat compounds or as solutions with certified concentrations. The accuracy and quality of these purchased standards is verified through documentation provided by these commercial sources. Most solutions and all neat materials require subsequent dilution to an appropriate working range. All dilutions performed are documented and the resulting solution is checked by obtaining the instrument response of the new solution and comparing with the response to the solution currently in use. Any discrepancies between the responses are investigated and resolved before the new solution is used. Each standard is assigned a code which allows traceability to the original components. The standard container is marked with the code, name of solution, concentration, date prepared, expiration date, and the initials of the preparer. Shelf life and storage conditions for standards are included in the standard operating procedures and old standards are replaced before their expiration date.

Each instrument is calibrated with a given frequency using one or more concentrations of the standard solution. As analysis proceeds, the calibration is checked for any unacceptable change in instrument response. If the calibration check verifies the initial response, the analysis proceeds. If the calibration check indicates that a significant change in instrument response has occurred, then a new calibration is initiated. If necessary, maintenance may be performed prior to the recalibration.

Calibration records are usually kept in the form of raw data with the other instrument printouts. In cases where no data system is used, calibration data is manually recorded in notebooks. Any maintenance or repair is also recorded in a notebook. The information recorded either in the notebooks or on the instrument printout includes the date, instrument ID, employee name and/or identification number, and concentration or code number of standard.

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The frequency of calibration and calibration verification, number of concentrations used, and acceptance criteria for each of the instruments to be used are listed in Table 8-1. In addition to checking the instrument response to target compounds, the GC/MS units are checked to ensure that standard mass spectral abundance criteria are met. Prior to each calibration, instruments being used for volatile compound analysis are tuned using bromofluorobenzene (BFB) and instruments being used for semivolatile analysis are tuned using decafluorotriphenylphosphine (DFTPP). The key ions and their abundance criteria are listed in Table 8-2.

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Table 8-1

Instrument	Initial Calibration			Continuing Calibration Verification		
	Frequency	# Std Conc	Acceptance Criteria	Frequency	# Std Conc	Acceptance Criteria
GC/MS Volatiles*	After C-cal fails	6	RF for SPCCs >0.300 for chlorobenzene and 1,2,2-tetrachloroethane, and >0.100 for 1,1-dichloroethene, bromoform and chloromethane CCCs <30%	Every 12 hours	1	RF for SPCCs >0.300 except for bromoform >0.10 %Drift for CCCs <20
GC/MS Semivolatiles*	After C-cal fails	6	RF for SPCC's >0.050 Max %RSD for CCC's <30%	Every 12 hours	1	RF for SPCCs 0.050 %Drift for CCCs <20
GC VOA Halocarbons and/or Aromatics	After C-cal fails	At least 5	%RSD of <20% for individual compounds or for average of all compounds	Every 12 hours, or every 10 samples	1	%Drift ± 15% for individual compounds or average of all compounds
GC Pesticides	Each new run After C-cal fails	5	20% RSD of RFs of initial calibration to use avg. RF, otherwise use curve fit. Degradation for DDT, endrin 15%  Alternatively, if the average of the %RSDs of all compounds in the calibration standard is ≤20%, then the AVG RF can be used for all compounds.	Every 10 samples  Every 20 samples or 12 hours for Method 8081A, 8082	1	≤15% difference from initial response for quantitation  C-cal - A CCV is also compliant if the average RPD is ≤15% for all compounds in the CCV standard.  DDT/Endrin breakdown check 15% every 12 hours or 20 injections
HPLC	Each new run or after C-cal fails	5	20% RSD of RFs of initial calibration to use average RF, otherwise use curve fit  Alternatively, if the average of the %RSDs of all compounds in the calibration standard is ≤20%, then the AVG RF can be used for all compounds.	Every 10 samples	1	≤15% difference from initial response for quantitation  C-cal - A CCV is also compliant if the average RPD is ≤15% for all compounds in the CCV standard.
GC TPH-GRO	After C-cal fails	At least 5	%RSD of <20% otherwise use calibration curve	Every 12 hours or every 10 samples	1	%Drift ±15%
CC TPH-DRO	After C-cal fails	5	% RSD of <20% otherwise use calibration curve	Every 10 samples	1	%Drift ±15%
ICP/Trace ICP	Each new run	1	Independent calibration verification within ±10%, standards <5%RSD	Every 10 samples	1	Same as initial
CVAA	Each new run	5	Independent calibration verification within ±10% Correlation coefficient >0.995	Every 10 samples	1	±20% of true value

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**Table 8-1**

Initial Calibration				Continuing Calibration Verification		
Instrument	Frequency	# Std Conc	Acceptance Criteria	Frequency	# Std Conc	Acceptance Criteria
GFAA	Each new run	5	Independent calibration verification within $\pm 10\%$ Correlation coefficient >0.995	Every 10 samples	1	$\pm 20\%$ of true value
Flame AA	Each new run	5	Independent calibration verification within $\pm 10\%$ Correlation coefficient >0.995	Every 10 samples	1	$\pm 20\%$ of true value
Autoanalyzer	Daily	6	Correlation coefficient >0.995	Every 10 samples	1	$\pm 10\%$ of true value
Infrared Spectrophotometer (FTIR)	Daily	5	Correlation coefficient >0.995	Every 10 samples	1	$\pm 10\%$ of true value
TOC Analyzer	Daily	5	$\pm 10\% @ STD$	Every 10 samples	1	$\pm 10\%$ of true value
TOX Analyzer	Each Batch	4	$\pm 5\% @ STD$	Every 8 samples	1	$\pm 5\%$ of true value
Balance	Daily	4	Top-loading balance $\pm .5\%$ Analytical balances $\pm .1\%$ for weights >.1 g .05 g $\pm .5\%$ .02 g $\pm 1.0\%$ .01 g $\pm 2.0\%$ .005 g $\pm 2.0\%$	N/A	N/A	N/A

\*All compounds with %RSD >15 must use first or second order regression fit of the six calibration points. Alternatively, if average of the %RSD of all compounds in calibration standard is  $\leq 15\%$ , the AVG RF can be used for all compounds.

Abbreviations

- # Std Conc - The number of standard concentrations used
- SPCCs - System performance check compounds
- CCCs - Calibration check compounds
- RF - Response factor
- %RSD - Percent relative standard deviation
- C-cal - Continuing calibration
- CVAA - Cold vapor atomic absorption spectrophotometer
- HPLC - High Performance Liquid Chromatography
- ICP - Inductively coupled plasma spectrophotometer; ICP run also includes interelement correction check standard (beginning and end of run)
- GFAA - Graphite furnace atomic absorption spectrophotometer

**Table 8-2**

<b>Mass</b>	<b>Ion Abundance Criteria</b>
<b>BFB Key Ion Abundance Criteria:</b>	
50	15% to 40% of mass 95
75	30% to 60% of mass 95
95	base peak, 100% relative abundance
96	5% to 9% of mass 95
173	less than 2% of mass 174
174	greater than 50% of mass 95
175	5% to 9% of mass 174
176	greater than 95% but less than 101% of mass 174
177	5% to 9% of mass 176
<b>DFTPP Key Ions and Ion Abundance Criteria:</b>	
51	30% to 60% of mass 198
68	less than 2% of mass 69
70	less than 2% of mass 69
127	40% to 60% of mass 198
197	less than 1% of mass 198
198	Base peak, 100% relative abundance
199	5% to 9% of mass 198
275	10% to 30% of mass 198
365	greater than 1% of mass 198
441	Present but less than mass 443
442	greater than 40% of mass 198
443	17% to 23% of mass 442

## **9. Analytical Procedures**

The analytical procedures to be used for organics and inorganics are those described in the USEPA SW-846 3rd Edition, Update III, 1996, for the preparation and analysis of water, sediment, and soil for the client specified compounds.

Copies of the analytical procedures are located in the laboratory and available for use by analysts. Copies of analytical methods are available upon request.

Volatiles by GC/MS - This method determines the concentration of volatile (purgeable) organics. The analysis is based on purging the volatiles onto a Tenax/silica gel trap, desorbing the volatiles onto a gas chromatographic column which separates them and identifying the separated components with a mass spectrometer. Method 8260B/5030B/5035.

Semivolatiles - This method determines the concentration of semivolatile organic compounds that are separated into an organic solvent and are amenable to gas chromatography. The method involves solvent extraction of the sample to isolate analytes and GC/MS analysis to determine semivolatile compounds present in the sample. Method 8270C.

Volatiles by GC - This method determines the concentration of volatile (purgeable) organic compounds. The analysis is based on purging the volatiles from the sample onto an appropriate sorbent trap and desorbing the volatiles onto a gas chromatographic column. Using an appropriate temperature program, the compounds are separated by the column and both qualitative and quantitative detection is achieved with a photoionization and/or electrolytic conductivity detector. Method 5030B/8021B/5035. Non-halogenated organics are analyzed by flame ionization detectors. Method 5030B/8015B, 5035.

Pesticides, PCBs, & Herbicides - This method determines the concentration of organochloride pesticides, polychlorinated biphenyls, herbicides, and organophosphate pesticides. The procedure includes solvent extraction of the sample, analysis of the extract on a gas chromatograph/electron capture detector

(GC/EC) using a capillary column, and confirmation on a GC/EC using a second capillary column. A nitrogen-phosphorus detector is used for organophosphates. If the compound concentration is sufficient, confirmation may be done on GC/MS upon request. Pesticides Methods 8081A and 8141A. PCBs Method 8082. Herbicides Method 8151A.

PAHs by HPLC - The sample aliquot is extracted with methylene chloride. The extract is filtered (soils), dried, concentrated by evaporation and exchanged into acetonitrile. Silica gel cleanup is used if necessary. The extract is analyzed by reverse-phase HPLC with both UV and fluorescence detectors. Methods 3550B/3630C/8310.

TPH-GRO - This method determines the concentration of gasoline range organics (2-methylpentane to 1,2,4-trimethylbenzene). The analysis is based on purging the volatiles from the sample onto an appropriate sorbent trap and desorbing the volatiles onto a gas chromatographic column. Using an appropriate temperature program, the compounds are separated by the column and both qualitative and quantitative detection is achieved with a flame ionization detector. BTEX may be determined simultaneously on systems equipped with a photoionization detector in tandem with the FID. Method 8015B/5030B/5035.

TPH-DRO - This method determines the concentration of diesel range organics (C-10 to C-28 hydrocarbons). The procedure includes solvent extraction of the sample and analysis of the extract on a gas chromatograph/flame ionization detector (GC/FID) using a megabore capillary column.

Method API "Method for Determination of Diesel Range Organics," Revision 2, 02/05/95; or California Department of Health Services LUFT Task Force TPH Analysis - Diesel Method (Modified), California Modified 8015 Method, Method 8015B.

Inductively Coupled Plasma (ICP) - This is a technique for the simultaneous determination of elements in solution after acid digestion. The basis of the method is the measurement of atomic emission by an optical spectroscopic technique. Characteristic atomic line emission spectra are produced by excitation of the

sample in a radio frequency inductively coupled plasma. Because the temperature of the plasma is considerably higher, it is especially useful for refractory metals.

Method 6010B.

The Trace ICP is the same technique as the ICP listed above except for the orientation of the plasma (horizontal instead of vertical) and upgraded optical and sample introduction systems, resulting in instrument detection limits approximately a magnitude lower than the traditional ICP.

Graphite Furnace Atomic Absorption (GFAA) - This is a method of analysis designed to detect trace amounts of the analyte through electrothermal atomization. Samples are digested before analysis. The graphite furnace AA spectrophotometer heats the sample within a graphite tube using an electrical current (i.e., flameless furnace) and measures the absorption of specific metallic elements at discrete wavelengths. (See attached list for method number.)

Cold Vapor Atomic Absorption - Organic mercury compounds are oxidized and the mercury is reduced to the elemental state and aerated from solution in a closed system. The mercury vapor passes through a cell positioned in the light path of a spectrophotometer and absorbance (peak height) is measured. Method 7470A/7471A.

Flame Atomic Absorption - This method is also suited to metals analysis. A solution of the sample to be analyzed is sprayed into a flame which generates sufficient heat to decompose the sample into its constituent atoms directly in the optical path. The difference in light intensity is measured at specific wavelengths using a spectrophotometer. (See attached list for method number.)

Total Cyanide Analysis - Distillation of the sample releases the cyanide from cyanide complexes as HCN. The liberated HCN and simple cyanides are converted to cyanogen chloride by reaction with chloramine T. This reacts with pyridine and barbituric acid reagent to give a red colored complex. The absorbance is read at 570 nm and is compared to a standard curve. An autoanalyzer is used. Method 9012A.

Phenols - This method is based on automated distillation of phenol and the subsequent reaction with 4-aminoantipyrine in basic buffer to produce a red colored complex. The absorbance is read at 505 nm and is compared to a standard curve. An autoanalyzer is used. Method 9066.

Moisture - A known sample weight is placed in a drying oven maintained at 103° to 105°C for 8 to 24 hours. The sample is reweighed after drying and this value is divided by the original weight. The result is used to calculate analytical concentration on a dry-weight basis. *Methods for the Chemical Analysis of Water and Wastes*, Office of R&D, USEPA-EMSL, Cincinnati, OH, USEPA 600/4-79-020. Method 160.3. (modified).

Total Petroleum Hydrocarbons - Samples are extracted with freon and the resulting solution is treated with silica gel to remove fatty acids and other polar compounds. The remaining nonpolar compounds are designated as petroleum hydrocarbons and are quantitatively measured using infrared spectroscopy. *Methods for the Chemical Analysis of Water and Wastes*, Office of R&D, USEPA-EMSL, Cincinnati, OH, March 1979, USEPA 600/4-79-020. Method 418.1 (modified for soils).

Sulfide Analysis - The sample is acidified and a known excess of iodine is added. The iodine reacts with sulfide in acid solution, oxidizing sulfide to sulfur. The excess iodine is back-titrated with sodium thiosulfate. Method 9030A.

Total Organic Carbon (TOC) - Following acidification, the sample is purged with nitrogen to remove inorganic carbon. Persulfate is injected to oxidize organic carbon to carbon dioxide which is detected by IR. An OI Model 700 TOC analyzer is used. Method 9060.

Total Organic Halogen (TOX) - Organic halogen is adsorbed onto an activated carbon column and combusted in an oxygen furnace. The resulting hydrogen halide gases are collected in an acetic acid buffer. The halides are titrated microcoulometrically through the generation of Ag<sup>+</sup> ions. A Mitsubishi TOX analyzer is used. Method 9020B.

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Inorganic Method Numbers				
	ICP	GFAA	Flame AA	Cold Vapor
Aluminum	6010B		7020	
Antimony	6010B	7041		
Arsenic	6010B	7060A		
Barium	6010B		7080A	
Beryllium	6010B	7091		
Cadmium	6010B	7131A	7130	
Calcium	6010B		7140	
Chromium	6010B	7191	7190	
Cobalt	6010B			
Copper	6010B	7211	7210	
Iron	6010B		7380	
Lead	6010B	7421	7420	
Magnesium	6010B		7450	
Manganese	6010B		7460	
Mercury				7470A/7471A
Molybdenum	6010B			
Nickel	6010B	7521	7520	
Potassium	6010B		7610	
Selenium	6010B	7740		
Silver	6010B	7761	7760A	
Sodium	6010B		7710	
Thallium	6010B	7841		
Tin	6010B			
Vanadium	6010B			
Zinc	6010B		7950	

The number of parameters analyzed and the method used will be determined by the site-specific requirements.

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Compounds	Waters		Soils**	
	LOQ* ( $\mu\text{g}/\text{L}$ )	J-Value ( $\mu\text{g}/\text{L}$ )	LOQ* ( $\mu\text{g}/\text{kg}$ )	J-Value ( $\mu\text{g}/\text{kg}$ )
Chloromethane	5.	3.	5.	2.
Bromomethane	5.	3.	5.	3.
Vinyl chloride	5.	2.	5.	2.
Chloroethane	5.	3.	5.	3.
Acrolein	100.	40.	100.	20.
Acrylonitrile	50.	10.	50.	10.
Methylene chloride	5.	2.	5.	2.
Trichlorofluoromethane	5.	2.	5.	2.
1,1-Dichloroethene	5.	1.	5.	2.
1,1-Dichloroethane	5.	2.	5.	1.
<i>trans</i> -1,2-Dichloroethene	5.	2.	5.	2.
Chloroform	5.	1.	5.	1.
1,2-Dichloroethane	5.	2.	5.	2.
1,1,1-Trichloroethane	5.	1.	5.	1.
Carbon tetrachloride	5.	1.	5.	1.
Bromodichloromethane	5.	1.	5.	2.
1,1,2,2-Tetrachloroethane	5.	2.	5.	1.
1,2-Dichloropropane	5.	1.	5.	3.
<i>trans</i> -1,3-Dichloropropene	5.	1.	5.	1.
Trichloroethene	5.	1.	5.	1.
Dibromochloromethane	5.	2.	5.	1.
1,1,2-Trichloroethane	5.	2.	5.	2.
Benzene	5.	1.	5.	1.
<i>cis</i> -1,3-Dichloropropene	5.	1.	5.	1.
2-Chloroethylvinyl ether	10.	2.	10.	2.
Bromoform	5.	1.	5.	1.
Tetrachloroethene	5.	1.	5.	1.
Toluene	5.	2.	5.	1.
Chlorobenzene	5.	1.	5.	1.
Ethylbenzene	5.	2.	5.	1.
Xylene (total)	5.	1.	5.	1.
<i>cis</i> -1,2-Dichloroethene	5.	2.	5.	2.

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\*Specific quantitation limits are highly matrix dependent. The quantitation limits listed herein are provided for guidance and may not always be achievable.

\*\*Quantitation limits listed for soil/sediment are based on wet weight. The quantitation limits calculated by the laboratory for soil/sediment, calculated on a dry-weight basis will be higher.

The laboratory routinely reports at the limit of quantitation (LOQ) but can estimate down to the J-value when requested by the client if a valid mass spectrum is obtained. Values reported below the LOQ are reported with a J-flag and are defined as estimated values.

LOQ and J-values are evaluated annually and subject to change.

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Compound	Waters		Soils**	
	LOQ* (µg/L)	J-Value (µg/L)	LOQ* (µg/kg)	J-Value (µg/kg)
Chloromethane	5.	3.	5.	2.
Bromomethane	5.	3.	5.	3.
Vinyl chloride	5.	2.	5.	2.
Dichlorodifluoromethane	5.	2.	5.	2.
Chloroethane	5.	3.	5.	3.
Methyl iodide	5.	1.	5.	3.
Acrolein	100.	40.	100.	20.
Acrylonitrile	50.	10.	50.	10.
Acetonitrile	100.	25.	100.	25.
Methylene chloride	5.	2.	5.	2.
Acetone	20.	6.	20.	7.
Trichlorofluoromethane	5.	2.	5.	2.
Carbon disulfide	5.	3.	5.	3.
Propionitrile	100.	30.	100.	30.
1,1-Dichloroethene	5.	1.	5.	2.
Allyl chloride	5.	1.	5.	1.
1,1-Dichloroethane	5.	2.	5.	1.
<i>trans</i> -1,2-Dichloroethene	5.	2.	5.	2.
Chloroform	5.	1.	5.	1.
1,2-Dichloroethane	5.	2.	5.	2.
Methacrylonitrile	50.	10.	50.	5.
2-Butanone	10.	3.	10.	7.
Dibromomethane	5.	1.	5.	1.
1,1,1-Trichloroethane	5.	1.	5.	1.
1,4-Dioxane	250.	70.	250.	70.
Carbon tetrachloride	5.	1.	5.	1.
Isobutyl alcohol	250.	100.	250.	100.
Vinyl acetate	10.	2.	10.	3.
Bromodichloromethane	5.	1.	5.	2.
2-Chloro-1,3-butadiene	5.	2.	5.	2.
1,2-Dichloropropane	5.	1.	5.	3.
<i>trans</i> -1,3-Dichloropropene	5.	1.	5.	1.
Trichloroethene	5.	1.	5.	1.
Dibromochloromethane	5.	2.	5.	1.
1,1,2-Trichloroethane	5.	2.	5.	2.

Compound	Waters		Soils**	
	LOQ* ( $\mu\text{g}/\text{L}$ )	J-Value ( $\mu\text{g}/\text{L}$ )	LOQ* ( $\mu\text{g}/\text{kg}$ )	J-Value ( $\mu\text{g}/\text{kg}$ )
1,2-Dibromoethane	5.	1.	5.	1.
cis-1,2-Dichloroethene	5.	2.	5.	2.
Benzene	5.	1.	5.	1.
cis-1,3-Dichloropropene	5.	1.	5.	1.
Methyl methacrylate	5.	1.	5.	1.
1,1,1,2-Tetrachloroethane	5.	1.	5.	2.
Bromoform	5.	1.	5.	1.
trans-1,4-Dichloro-2-butene	50.	15.	50.	10.
1,2,3-Trichloropropane	5.	1.	5.	1.
2-Hexanone	10.	7.	10.	3.
4-Methyl-2-pentanone	10.	5.	10.	3.
Tetrachloroethene	5.	1.	5.	1.
1,1,2,2-Tetrachloroethane	5.	2.	5.	1.
Toluene	5.	2.	5.	1.
Ethyl methacrylate	5.	1.	5.	1.
Chlorobenzene	5.	1.	5.	1.
Pentachloroethane	5.	1.	5.	1.
Ethylbenzene	5.	2.	5.	1.
1,2-Dibromo-3-chloropropane	5.	3.	5.	2.
Styrene	5.	1.	5.	1.
Xylenes (total)	5.	1.	5.	1.

For samples preserved with 1 + 1 HCl to pH <2, low recovery of acid labile compounds is likely to occur.

\*Specific quantitation limits are highly matrix dependent. The quantitation limits listed herein are provided for guidance and may not always be achievable.

\*\*Quantitation limits listed for soil/sediment are based on wet weight. The quantitation limits calculated by the laboratory for soil/sediment, calculated on a dry-weight basis will be higher.

The laboratory routinely reports at the limit of quantitation (LOQ) but can estimate down to the J-value when requested by the client if a valid mass spectrum is obtained. Values reported below the LOQ are reported with a J-flag and are defined as estimated values.

LOQ and J-values are evaluated annually and subject to change.

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Compound	Waters		Soils**	
	LOQ* ( $\mu\text{g/L}$ )	J-Value ( $\mu\text{g/L}$ )	LOQ* ( $\mu\text{g/kg}$ )	J-Value ( $\mu\text{g/kg}$ )
Dichlorodifluoromethane	5.	2.	5.	2.
Chloromethane	5.	3.	5.	2.
Vinyl Chloride	5.	2.	5.	2.
Bromomethane	5.	3.	5.	3.
Chloroethane	5.	3.	5.	3.
Trichlorofluoromethane	5.	2.	5.	2.
1,1-Dichloroethene	5.	1.	5.	2.
1,1-Dichloroethane	5.	1.	5.	1.
Methylene Chloride	5.	2.	5.	2.
<i>trans</i> -1,2-Dichloroethene	5.	2.	5.	2.
2,2-Dichloropropane	5.	1.	5.	1.
<i>cis</i> -1,2-Dichloroethene	5.	2.	5.	2.
Chloroform	5.	1.	5.	1.
Bromo(chloro)methane	5.	1.	5.	1.
1,1,1-Trichloroethane	5.	1.	5.	1.
Carbon Tetrachloride	5.	1.	5.	1.
1,1-Dichloropropene	5.	1.	5.	1.
Benzene	5.	1.	5.	1.
1,2-Dichloroethane	5.	2.	5.	2.
Trichloroethene	5.	1.	5.	1.
1,2-Dichloropropane	5.	1.	5.	3.
Dibromomethane	5.	1.	5.	1.
Bromodichloromethane	5.	1.	5.	2.
Toluene	5.	2.	5.	1.
1,1,2-Trichloroethane	5.	2.	5.	2.
Tetrachloroethene	5.	1.	5.	1.
1,3-Dichloropropane	5.	1.	5.	1.
Dibromochloromethane	5.	2.	5.	1.
1,2-Dibromoethane	5.	1.	5.	1.
Chlorobenzene	5.	1.	5.	1.
1,1,1,2-Tetrachloroethane	5.	1.	5.	2.
Ethylbenzene	5.	2.	5.	1.
<i>m+p</i> -Xylene	5.	1.	5.	1.
<i>o</i> -Xylene	5.	1.	5.	1.

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Compound	Waters		Soils**	
	LOQ* ( $\mu\text{g}/\text{L}$ )	J-Value ( $\mu\text{g}/\text{L}$ )	LOQ* ( $\mu\text{g}/\text{kg}$ )	J-Value ( $\mu\text{g}/\text{kg}$ )
Styrene	5.	1.	5.	1.
Bromoform	5.	1.	5.	1.
Isopropylbenzene	5.	2.	5.	3.
1,1,2,2-Tetrachloroethane	5.	2.	5.	1.
Bromobenzene	5.	1.	5.	1.
1,2,3-Trichloropropane	5.	1.	5.	1.
n-Propylbenzene	5.	1.	5.	1.
2-Chlorotoluene	5.	1.	5.	1.
1,3,5-Trimethylbenzene	5.	1.	5.	1.
4-Chlorotoluene	5.	1.	5.	1.
tert-Butylbenzene	5.	1.	5.	1.
1,2,4-Trimethylbenzene	5.	1.	5.	1.
sec-Butylbenzene	5.	1.	5.	1.
p-Isopropyltoluene	5.	1.	5.	1.
1,3-Dichlorobenzene	5.	2.	5.	2.
1,4-Dichlorobenzene	5.	2.	5.	2.
n-Butylbenzene	5.	1.	5.	1.
1,2-Dichlorobenzene	5.	2.	5.	2.
1,2-Dibromo-3-chloropropane	5.	3.	5.	2.
1,2,4-Trichlorobenzene	5.	1.	5.	1.
Hexachlorobutadiene	5.	2.	5.	2.
Naphthalene	5.	1.	5.	1.
1,2,3-Trichlorobenzene	5.	1.	5.	1.

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LOQ and J-values are evaluated annually and subject to change.

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Compound	Waters		Soils**	
	LOQ* (µg/L)	J-Value (µg/L)	LOQ* (µg/kg)	J-Value (µg/kg)
2-Chlorophenol	10.	1.	330.	33.
Phenol	10.	1.	330.	33.
2-Nitrophenol	10.	2.	330.	67.
2,4-Dimethylphenol	10.	1.	330.	67.
2,4-Dichlorophenol	10.	2.	330.	33.
4-Chloro-3-methylphenol	10.	2.	330.	67.
2,4,6-Trichlorophenol	10.	1.	330.	67.
2,4-Dinitrophenol	25.	5.	830.	167.
4-Nitrophenol	25.	5.	830.	167.
2-Methyl-4,6-dinitrophenol	25.	5.	830.	167.
Pentachlorophenol	25.	1.	830.	167.
N-nitrosodimethylamine	10.	2.	330.	67.
bis (2-Chloroethyl) ether	10.	1.	330.	67.
1,3-Dichlorobenzene	10.	1.	330.	33.
1,4-Dichlorobenzene	10.	1.	330.	33.
1,2-Dichlorobenzene	10.	1.	330.	33.
bis (2-Chloroisopropyl) ether	10.	2.	330.	100.
Hexachloroethane	10.	2.	330.	67.
N-nitrosodi-n-propylamine	10.	2.	330.	67.
Nitrobenzene	10.	1.	330.	33.
Isophorone	10.	1.	330.	67.
bis (2-Chloroethoxy) methane	10.	1.	330.	33.
1,2,4-trichlorobenzene	10.	1.	330.	33.
Naphthalene	10.	1.	330.	33.
Hexachlorobutadiene	10.	1.	330.	67.
Hexachlorocyclopentadiene	10.	3.	330.	167.
2-Choronaphthalene	10.	1.	330.	33.
Acenaphthylene	10.	1.	330.	33.
Dimethyl phthalate	10.	3.	330.	33.
2,6-Dinitrotoluene	10.	1.	330.	67.
Acenaphthene	10.	1.	330.	33.
2,4-Dinitrotoluene	10.	2.	330.	67.
Fluorene	10.	1.	330.	33.
4-Chlorophenyl phenyl ether	10.	2.	330.	67.

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Compound	Waters		Soils**	
	LOQ* (µg/L)	J-Value (µg/L)	LOQ* (µg/kg)	J-Value (µg/kg)
Diethyl phthalate	10.	2.	330.	67.
1,2-Diphenylhydrazine	10.	1.	330.	67.
N-nitrosodiphenylamine	10.	2.	330.	67.
4-Bromophenyl phenyl ether	10.	2.	330.	100.
Hexachlorobenzene	10.	1.	330.	100.
Phenanthrene	10.	1.	330.	33.
Anthracene	10.	1.	330.	33.
Di-n-butyl phthalate	10.	1.	330.	33.
Fluoranthene	10.	1.	330.	33.
Pyrene	10.	1.	330.	67.
Benzidine	100.	20.	3300.	833.
Butyl benzyl phthalate	10.	2.	330.	67.
Benzo (a) anthracene	10.	1.	330.	33.
Chrysene	10.	1.	330.	33.
3,3'-Dichlorobenzidine	20.	2.	670.	133.
bis (2-Ethylhexyl) phthalate	10.	2.	330.	67.
Di-n-octyl phthalate	10.	2.	330.	67.
Benzo (b) fluoranthene	10.	2.	330.	67.
Benzo (k) fluoranthene	10.	2.	330.	133.
Benzo (a) pyrene	10.	2.	330.	67.
Indeno (1,2,3-cd) pyrene	10.	2.	330.	67.
Dibenz (a,h) anthracene	10.	2.	330.	67.
Benzo (ghi) perylene	10.	2.	330.	67.

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Compound	Waters		Soils**	
	LOQ* (µg/L)	J-Value (µg/L)	LOQ* (µg/kg)	J-Value (µg/kg)
Acenaphthene	10.	1.	330.	33.
Acenaphthylene	10.	1.	330.	33.
Acetophenone	10.	2.	330.	33.
2-Acetylaminofluorene	10.	2.	330.	67.
4-Aminobiphenyl	10.	1.	330.	133.
Aniline	10.	2.	330.	100.
Anthracene	10.	1.	330.	33.
Benzo (a) anthracene	10.	1.	330.	33.
Benzo (b) fluoranthene	10.	2.	330.	67.
Benzo (k) fluoranthene	10.	2.	330.	133.
Benzo (ghi) perylene	10.	2.	330.	67.
Benzo (a) pyrene	10.	2.	330.	67.
Benzyl alcohol	20.	2.	670.	100.
bis (2-Chloroethoxy) methane	10.	1.	330.	33.
bis (2-Chloroethyl) ether	10.	1.	330.	67.
bis (2-Ethylhexyl) phthalate	10.	2.	330.	67.
4-Bromophenyl phenyl ether	10.	2.	330.	100.
Butyl benzyl phthalate	10.	2.	330.	67.
4-Chloroaniline	10.	2.	330.	100.
Chlorobenzilate	10.	4.	330.	67.
4-Chloro-3-methylphenol	10.	2.	330.	67.
2-Choronaphthalene	10.	1.	330.	33.
2-Chlorophenol	10.	1.	330.	33.
4-Chlorophenyl phenyl ether	10.	2.	330.	67.
Chrysene	10.	1.	330.	33.
2-methyl phenol	10.	2.	330.	67.
3 and 4 methyl phenol	10.	2.	330.	100.
Diallate	10.	2.	330.	100.
Dibenzofuran	10.	1.	330.	33.
Di-n-butyl phthalate	10.	1.	330.	33.
Dibenzo (a,h) anthracene	10.	2.	330.	67.
1,2-Dichlorobenzene	10.	1.	330.	33.
1,3-Dichlorobenzene	10.	1.	330.	33.
1,4-Dichlorobenzene	10.	1.	330.	33.
3,3'-Dichlorobenzidine	20.	2.	670.	133.

Compound	Appendix IX Semivolatile Compounds			
	Waters		Soils**	
	LOQ* (µg/L)	J-Value (µg/L)	LOQ* (µg/kg)	J-Value (µg/kg)
2,4-Dichlorophenol	10.	2.	330.	33.
2,6-Dichlorophenol	10.	1.	330.	67.
Diethyl phthalate	10.	2.	330.	67.
Dimethoate	10.	2.	330.	100.
p-(Dimethylamino) azobenzene	10.	1.	330.	133.
7,12-Dimethylbenz(a) anthracene	10.	2.	330.	33.
3,3'-Dimethylbenzidine	20.	2.	670.	100.
a,a-dimethyl-1-phenethylamine	20.	1.	670.	67.
2,4-Dimethylphenol	10.	1.	330.	67.
Dimethyl phthalate	10.	3.	330.	33.
m-Dinitrobenzene	10.	2.	330.	67.
2-Methyl-4,6-dinitrophenol	25.	5.	830.	167.
2,4-Dinitrophenol	25.	5.	830.	167.
2,4-Dinitrotoluene	10.	2.	330.	67.
2,6-Dinitrotoluene	10.	1.	330.	67.
Di-n-octyl phthalate	10.	2.	330.	67.
Ethyl methanesulfonate	20.	1.	670.	67.
Fluoranthene	10.	1.	330.	33.
Fluorene	10.	1.	330.	33.
Hexachlorobenzene	10.	1.	330.	100.
Hexachlorobutadiene	10.	1.	330.	67.
Hexachlorocyclopentadiene	10.	3.	330.	167.
Hexachloroethane	10.	2.	330.	67.
Hexachloropropene	10.	2.	330.	67.
Indeno (1,2,3-cd) pyrene	10.	2.	330.	67.
Isodrin	20.	1.	670.	33.
Isophorone	10.	1.	330.	67.
Isosafrole	10.	1.	330.	33.
Methapyrilene	20.	1.	670.	133.
3-Methylchloranthene	10.	2.	330.	67.
Methyl methanesulfonate	10.	1.	330.	33.
Methylnaphthalene	10.	1.	330.	33.
Naphthalene	10.	1.	330.	33.
1,4-Naphthoquinone	10.	1.	330.	100.
1-Naphthylamine	10.	2.	330.	33.

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Appendix IX Semivolatile Compounds				
Compound	Waters		Soils**	
	LOQ* (µg/L)	J-Value (µg/L)	LOQ* (µg/kg)	J-Value (µg/kg)
2-Naphthylamine	10.	2.	330.	33.
2-Nitroaniline	10.	1.	330.	67.
3-Nitroaniline	10.	1.	330.	67.
4-Nitroaniline	10.	2.	330.	100.
Nitrobenzene	10.	1.	330.	33.
2-Nitrophenol	10.	2.	330.	67.
4-Nitrophenol	25.	5.	830.	167.
4-Nitroquinoline 1-oxide	100.	10.	3300.	330.
N-Nitrosodi-n-butylamine	10.	2.	330.	67.
N-Nitrosodiethylamine	10.	2.	330.	100.
N-Nitrosodimethylamine	10.	2.	330.	67.
N-Nitrosodiphenylamine1	10.	2.	330.	67.
N-Nitrosodi-n-propylamine	10.	2.	330.	67.
N-Nitrosomethylethylamine	10.	2.	330.	133.
N-Nitrosomorpholine	10.	1.	330.	67.
N-Nitrosopiperidine	10.	2.	330.	67.
N-Nitrospyrrolidine	10.	2.	330.	100.
5-Nitro-o-toluidine	10.	2.	330.	100.
Pentachlorobenzene	10.	1.	330.	67.
Pentachloronitrobenzene	10.	2.	330.	100.
Pentachlorophenol	25.	1.	830.	167.
Phenacetin	10.	2.	330.	67.
Phenanthrene	10.	1.	330.	33.
Phenol	10.	1.	330.	33.
1,4-Phenylenediamine	200.	20.	6700.	667.
2-Picoline	10.	1.	330.	67.
Pronamide	10.	1.	330.	100.
Pyrene	10.	1.	330.	67.
Pyridine	10.	2.	330.	33.
Safrole	10.	2.	330.	67.
1,2,4,5-Tetrachlorobenzene	10.	1.	330.	67.
2,3,4,6-Tetrachlorophenol	10.	2.	330.	33.
Tetraethyl dithiopyrophosphate	10.	2.	330.	67.
Thionazin	20.	2.	670.	200.
o-Toluidine	10.	2.	330.	100.

Compound	Waters		Soils**	
	LOQ* ( $\mu\text{g}/\text{L}$ )	J-Value ( $\mu\text{g}/\text{L}$ )	LOQ* ( $\mu\text{g}/\text{kg}$ )	J-Value ( $\mu\text{g}/\text{kg}$ )
1,2,4-Trichlorobenzene	10.	1.	330.	33.
2,4,5-Trichlorophenol	10.	1.	330.	67.
2,4,6-Trichlorophenol	10.	1.	330.	67.
0,0,0-Triethylphosphorothioate	10.	2.	330.	67.
1,3,5-Trinitrobenzene	10.	5.	330.	167.

\*Specific quantitation limits are highly matrix dependent. The quantitation limits listed herein are provided for guidance and may not always be achievable.

\*\*Quantitation limits listed for soil/sediment are based on wet weight. The quantitation limits calculated by the laboratory for soil/sediment, calculated on a dry-weight basis will be higher.

The laboratory routinely reports at the limit of quantitation (LOQ) but can estimate down to the J-value when requested by the client if a valid mass spectrum is obtained. Values reported below the LOQ are reported with a J-flag and are defined as estimated values.

<sup>1</sup>N-Nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-Nitrosodiphenylamine represents the combined total of both compounds.

LOQ and J-values are evaluated annually and subject to change.

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Compound	Waters		Soils**	
	LOQ* ( $\mu\text{g}/\text{L}$ )	J-Value ( $\mu\text{g}/\text{L}$ )	LOQ* ( $\mu\text{g}/\text{kg}$ )	J-Value ( $\mu\text{g}/\text{kg}$ )
Chloromethane	5.	.5	100.	10.
Bromomethane	5.	.5	100.	1.
Dichlorodifluoromethane	2.	.2	40.	8.
Vinyl chloride	1.	.2	20.	4.
Chloroethane	1.	.2	20.	4.
Methylene chloride	1.	.2	20.	4.
Trichlorodifluoromethane	1.	.2	20.	4.
1,1-Dichloroethene	1.	.2	20.	4.
1,1-Dichloroethane	1.	.2	20.	4.
cis-1,2-Dichloroethene	1.	.2	20.	4.
trans-1,2-Dichloroethene	1.	.2	20.	4.
Chloroform	1.	.2	20.	4.
1,2-Dichloroethane	1.	.2	20.	4.
1,1,1-Trichloroethane	1.	.2	20.	4.
Carbon tetrachloride	1.	.2	20.	4.
Bromodichloromethane	1.	.2	20.	4.
1,2-Dichloropropane	1.	.2	20.	4.
trans-1,3-Dichloropropene	1.	.2	20.	4.
Trichloroethene	1.	.2	20.	4.
Dibromochloromethane	1.	.2	20.	4.
1,1,2-Trichloroethane	1.	.2	20.	4.
cis-1,3-Dichloropropene	1.	.2	20.	4.
2-Chloroethylvinyl-ether	10.	1.0	200.	20.
Bromoform	1.	.2	20.	4.
1,1,2,2-Tetrachloroethane	1.	.2	20.	4.
Tetrachloroethene	1.	.2	20.	4.
Chlorobenzene	1.	.2	20.	4.
Benzene	1.	.2	20.	4.
Toluene	1.	.2	20.	4.
Ethylbenzene	1.	.2	20.	4.
<i>o</i> -Xylene	1.	.6	60.	12.
<i>m</i> -Xylene	2.	.6	60.	12.
<i>p</i> -Xylene	3.	.6	60.	12.

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\*Specific quantitation limits are highly matrix dependent. The quantitation limits listed herein are provided for guidance and may not always be achievable.

\*\*Quantitation limits listed for soil/sediment are based on wet weight. The quantitation limits calculated by the laboratory for soil/sediment, calculated on a dry-weight basis will be higher.

The laboratory routinely reports at the limit of quantitation (LOQ) but can estimate down to the J-value when requested by the client. Values reported below the LOQ are reported with a J-flag and are defined as estimated values.

LOQ and J-values are evaluated annually and subject to change.

TPH GRO/DRO				
Compound	Waters		Soils**	
	LOQ* (mg/L)	J-Value (mg/L)	LOQ* (mg/kg)	J-Value (mg/kg)
TPH-GRO	0.05	0.02	1.	0.2
TPH-DRO	0.4	0.2	7.	4.

**NOTE:** J-values listed are higher than determined MDLs. This is because the method sums the total detectable area under the chromatographic plot in region of interest, instead of actual fuel peak area as the respective fuel.

\*Specific quantitation limits are highly matrix dependent. The quantitation limits listed herein are provided for guidance and may not always be achievable.

\*\*Quantitation limits listed for soil/sediment are based on wet weight. The quantitation limits calculated by the laboratory for soil/sediment, calculated on a dry-weight basis will be higher.

The laboratory routinely reports at the limit of quantitation (LOQ) but can estimate down to the J-value when requested by the client. Values reported below the LOQ are reported with a J-flag and are defined as estimated values.

LOQ and J-values are evaluated annually and subject to change.

Compound	Waters		Soils**	
	LOQ* ( $\mu\text{g}/\text{L}$ )	J-Value ( $\mu\text{g}/\text{L}$ )	LOQ* ( $\mu\text{g}/\text{kg}$ )	J-Value ( $\mu\text{g}/\text{kg}$ )
Benzene	1.	0.2	5.	2.
Toluene	1.	0.2	5.	2.
Ethylbenzene	1.	0.2	5.	2.
Total Xylene	3.	0.6	15.	5.
Methyl Teritary Butyl Ether	1.	0.3	20.	5.
Naphthalene	5.	1.	20.	5.

\*Specific quantitation limits are highly matrix dependent. The quantitation limits listed herein are provided for guidance and may not always be achievable.

\*\*Quantitation limits listed for soil/sediment are based on wet weight. The quantitation limits calculated by the laboratory for soil/sediment, calculated on a dry-weight basis will be higher.

The laboratory routinely reports at the limit of quantitation (LOQ) but can estimate down to the J-value when requested by the client. Values reported below the LOQ are reported with a J-flag and are defined as estimated values.

LOQ and J-values are evaluated annually and subject to change.

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Compound	Waters		Soils**	
	LOQ* (µg/L)	J-Value (µg/L)	LOQ* (µg/kg)	J-Value (µg/kg)
alpha-BHC	0.01	0.002	0.33	.067
beta-BHC	0.01	0.002	0.33	.067
gamma-BHC (Lindane)	0.01	0.002	0.33	.067
delta-BHC	0.01	0.002	0.33	.067
Heptachlor	0.01	0.002	0.33	.067
Aldrin	0.01	0.002	0.33	.067
Heptachlor epoxide	0.01	0.002	0.33	.067
4,4-DDE	0.02	0.004	0.67	.13
4,4-DDD	0.02	0.004	0.67	.13
4,4-DDT	0.02	0.004	0.67	.13
Dieldrin	0.02	0.004	0.67	.13
Endrin	0.02	0.004	0.67	.13
Chlordane	0.5	0.05	17.	3.3
Toxaphene	1.	0.2	33.	6.7
Endosulfan I	0.01	0.002	0.33	.067
Endosulfan II	0.02	0.004	0.67	.13
Endosulfan sulfate	0.02	0.004	0.67	.13
Endrin aldehyde	0.02	0.004	0.67	.13
Methoxychlor	0.1	0.002	3.3	.67
PCB-1016	0.5	0.1	17.	3.3
PCB-1221	0.5	0.1	17.	3.3
PCB-1232	0.5	0.1	17.	3.3
PCB-1242	0.5	0.1	17.	3.3
PCB-1248	0.5	0.1	17.	3.3
PCB-1254	0.5	0.1	17.	3.3
PCB-1260	0.5	0.1	17.	3.3

\*Specific quantitation limits are highly matrix dependent. The quantitation limits listed herein are provided for guidance and may not always be achievable.

\*\*Quantitation limits listed for soil/sediment are based on wet weight. The quantitation limits calculated by the laboratory for soil/sediment, calculated on a dry-weight basis will be higher.

The laboratory routinely reports at the limit of quantitation (LOQ) but can estimate down to the J-value when requested by the client. Values reported below the LOQ are reported with a J-flag and are defined as estimated values.

LOQ and J-values are evaluated annually and subject to change.

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**Appendix IX Organochlorines**

Compound	Waters		Soils**	
	LOQ* (µg/L)	J-Value (µg/L)	LOQ* (µg/kg)	J-Value (µg/kg)
Aldrin	0.01	0.002	0.33	.067
alpha-BHC	0.01	0.002	0.33	.067
beta-BHC	0.01	0.002	0.33	.067
delta-BHC	0.01	0.002	0.33	.067
gamma-BHC (Lindane)	0.01	0.002	0.33	.067
Chlordane	0.5	0.05	17.	3.3
4,4-DDT	0.02	0.004	0.67	.13
4,4-DDE	0.02	0.004	0.67	.13
4,4-DDD	0.02	0.004	0.67	.13
Dieldrin	0.02	0.004	0.67	.13
Endosulfan I	0.01	0.002	0.33	.067
Endosulfan II	0.02	0.004	0.67	.13
Endosulfan sulfate	0.02	0.004	0.67	.13
Endrin	0.02	0.004	0.67	.13
Endrin aldehyde	0.02	0.004	0.67	.13
Heptachlor	0.01	0.002	0.33	.067
Heptachlor epoxide	0.01	0.002	0.33	.067
Kepone	0.1	0.02	3.3	.67
Methoxychlor	0.1	0.002	3.3	.67
PCB-1016	0.5	0.1	17.	3.3
PCB-1221	0.5	0.1	17.	3.3
PCB-1232	0.5	0.1	17.	3.3
PCB-1242	0.5	0.1	17.	3.3
PCB-1248	0.5	0.1	17.	3.3
PCB-1254	0.5	0.1	17.	3.3
PCB-1260	0.5	0.1	17.	3.3
Toxaphene	1.	0.2	33.	6.7

\*Specific quantitation limits are highly matrix dependent. The quantitation limits listed herein are provided for guidance and may not always be achievable.

\*\*Quantitation limits listed for soil/sediment are based on wet weight. The quantitation limits calculated by the laboratory for soil/sediment, calculated on a dry-weight basis will be higher.

The laboratory routinely reports at the limit of quantitation (LOQ) but can estimate down to the J-value when requested by the client. Values reported below the LOQ are reported with a J-flag and are defined as estimated values

LOQ and J-values are evaluated annually and subject to change.

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**Appendix IX Herbicide Compounds**

Compound	Waters		Soils**	
	LOQ* (µg/L)	J-Value (µg/L)	LOQ* (µg/kg)	J-Value (µg/kg)
2,4-D	.5	.1	17.	3.3
Dinoseb	.25	.05	8.3	1.7
2,4,5-TP	.05	.01	1.7	3.3
2,4,5-T	.05	.01	1.7	3.3

\*Specific quantitation limits are highly matrix dependent. The quantitation limits listed herein are provided for guidance and may not always be achievable.

\*\*Quantitation limits listed for soil/sediment are based on wet weight. The quantitation limits calculated by the laboratory for soil/sediment, calculated on a dry-weight basis will be higher.

The laboratory routinely reports at the limit of quantitation (LOQ) but can estimate down to the J-value when requested by the client. Values reported below the LOQ are reported with a J-flag and are defined as estimated values.

LOQ and J-values are evaluated annually and subject to change.

Compound	Waters		Soils**	
	LOQ* (µg/L)	J-Value (µg/L)	LOQ* (µg/kg)	J-Value (µg/kg)
Disulfoton	.4	.2	13.	6.5
Methyl parathion	.4	.2	13.	6.5
Ethyl parathion	.4	.2	13.	6.5
Famphur	.4	.2	13.	6.7
Phorate	.4	.2	13.	6.5

\*Specific quantitation limits are highly matrix dependent. The quantitation limits listed herein are provided for guidance and may not always be achievable.

\*\*Quantitation limits listed for soil/sediment are based on wet weight. The quantitation limits calculated by the laboratory for soil/sediment, calculated on a dry-weight basis will be higher.

The laboratory routinely reports at the limit of quantitation (LOQ) but can estimate down to the J-value when requested by the client. Values reported below the LOQ are reported with a J-flag and are defined as estimated values.

LOQ and J-values are evaluated annually and subject to change.

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Compound	Waters		Soils**	
	LOQ* ( $\mu\text{g/L}$ )	J-Value ( $\mu\text{g/L}$ )	LOQ* ( $\mu\text{g/kg}$ )	J-Value ( $\mu\text{g/kg}$ )
Naphthalene	.8.	.8	270.	27.
Acenaphthylene	.8.	.8	270.	27.
Acenaphthene	.8.	.8	270.	27.
Fluorene	.8	.17	27.	2.5
Phenanthrene	.3	.046	11.	1.
Anthracene	.2	.031	5.	0.5
Fluoranthene	.2	.02	5.	0.5
Pyrene	.8	.18	27.	2.5
Benzo(a)anthracene	.08	.018	3.	0.25
Chrysene	.3	.059	11.	1.
Benzo(b)fluoranthene	.06	.035	2.	0.2
Benzo(k)fluoranthene	.06	.027	2.	0.2
Benzo(a)pyrene	.08	.022	3.	0.25
Dibenzo(a,h)anthracene	.2	.047	5.	0.5
Benzo(g,h,i)perylene	.5	.099	16.	1.5
Indeno(1,2,3-cd)pyrene	.3	.064	11.	1.

\*Specific quantitation limits are highly matrix dependent. The quantitation limits listed herein are provided for guidance and may not always be achievable.

\*\*Quantitation limits listed for soil/sediment are based on wet weight. The quantitation limits calculated by the laboratory for soil/sediment, calculated on a dry-weight basis will be higher.

The laboratory routinely reports at the limit of quantitation (LOQ) but can estimate down to the J-value when requested by the client. Values reported below the LOQ are reported with a J-flag and are defined as estimated values.

LOQ and J-values are evaluated annually and subject to change.

Analyte	Waters		Soils**	
	LOQ* (mg/L)	J-Value (mg/L)	LOQ* (mg/kg)	J-Value (mg/kg)
Antimony	0.2	0.015	20.	2.2
Arsenic <sup>1</sup>	0.01	0.0027	1.	0.25
Beryllium	0.01	0.0013	0.5	0.074
Cadmium	0.01	0.0027	2.	0.13
Chromium	0.03	0.0043	4.	0.47
Copper	0.025	0.0038	4.	0.50
Lead <sup>1</sup>	0.005	0.0020	0.5	0.16
Mercury <sup>2</sup>	0.0002	0.000043	0.1	0.028
Nickel	0.05	0.0054	5.	0.46
Selenium <sup>1</sup>	0.01	0.0027	0.5	0.18
Silver	0.02	0.0036	2.	0.45
Thallium <sup>1</sup>	0.02	0.0045	2.	0.39
Zinc	0.025	0.012	10.	0.40
Cyanide	0.005	0.004	0.125	0.1

<sup>1</sup>Analyzed by Trace ICP

<sup>2</sup>Analyzed by Cold Vapor

Except for cyanide, all other elements analyzed by ICP.

\*Specific quantitation limits are highly matrix dependent. The quantitation limits listed herein are provided for guidance and may not always be achievable.

\*\*Quantitation limits listed for soil/sediment are based on wet weight. The quantitation limits calculated by the laboratory for soil/sediment, calculated on a dry-weight basis will be higher.

The laboratory routinely reports at the limit of quantitation (LOQ) but can estimate down to the J-value when requested by the client. Values reported below the LOQ are reported with a J-flag and are defined as estimated values.

LOQ and J-values are evaluated annually and subject to change.

Analyte	Waters		Soils**	
	LOQ* (mg/L)	J-Value (mg/L)	LOQ* (mg/kg)	J-Value (mg/kg)
Antimony	0.2	0.015	20.	2.2
Arsenic <sup>1</sup>	0.01	0.0027	1.	0.25
Barium	0.1	0.0022	10.	2.2
Beryllium	0.01	0.0013	0.5	0.074
Cadmium	0.01	0.0027	2.	0.13
Chromium	0.03	0.0043	4.	0.47
Cobalt	0.05	0.0055	5.	0.52
Copper	0.025	0.0038	4.	0.50
Lead <sup>1</sup>	0.005	0.0020	0.5	0.16
Mercury <sup>2</sup>	0.0002	0.000043	0.1	0.028
Nickel	0.05	0.0054	5.	0.46
Selenium <sup>1</sup>	0.01	0.0027	0.5	0.18
Silver	0.02	0.0036	2.	0.45
Thallium <sup>1</sup>	0.02	0.0045	2.	0.39
Tin	0.3	0.025	25.	2.2
Vanadium	0.02	0.0070	2.	0.68
Zinc	0.025	0.012	10.	0.40
Cyanide	0.005	0.004	0.125	0.1
Sulfide	2.	0.56	20.	5.46

<sup>1</sup>Analysis by Trace ICP

<sup>2</sup>Analysis by Cold Vapor

Except for cyanide and sulfide, all other elements analyzed by ICP.

\*Specific quantitation limits are highly matrix dependent. The quantitation limits listed herein are provided for guidance and may not always be achievable.

\*\*Quantitation limits listed for soil/sediment are based on wet weight. The quantitation limits calculated by the laboratory for soil/sediment, calculated on a dry-weight basis will be higher.

The laboratory routinely reports at the limit of quantitation (LOQ) but can estimate down to the J-value when requested by the client. Values reported below the LOQ are reported with a J-flag and are defined as estimated values.

LOQ and J-values are evaluated annually and subject to change.

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Parameter	Waters		Soils**	
	LOQ* (mg/L)	J-Value (mg/L)	LOQ* (mg/kg)	J-Value (mg/kg)
Phenols	0.01	0.004	0.7	0.23
TOC	1.0	0.16	50.	12.
TOX	5. µg/L	1.3 µg/L	100.	100.
TPH	0.5	0.16	40.	12.6

\*Specific quantitation limits are highly matrix dependent. The quantitation limits listed herein are provided for guidance and may not always be achievable.

\*\*Quantitation limits listed for soil/sediment are based on wet weight. The quantitation limits calculated by the laboratory for soil/sediment, calculated on a dry-weight basis will be higher.

The laboratory routinely reports at the limit of quantitation (LOQ) but can estimate down to the J-value when requested by the client. Values reported below the LOQ are reported with a J-flag and are defined as estimated values.

LOQ and J-values are evaluated annually and subject to change.

## **10. Data Reduction, Validation, and Reporting**

Raw analytical data generated in the laboratories is collected on printouts from the instruments and associated data system or manually in bound notebooks. Analysts review data as it is generated to determine that the instruments are performing within specifications. This review includes calibration checks, surrogate recoveries, blank checks, retention time reproducibility, and other QC checks described in Sections No. 8 and 11. If any problems are noted during the analytical run, corrective action is taken and documented.

Each analytical run is reviewed by a chemist for completeness and accuracy prior to interpretation and data reduction. The following calculations are used to reduce raw data to reportable results.

GC/MS calculation used by the data system to determine concentration in extract for **semivolatiles** or in the sample itself for **volatiles**:

$$Q = (Ax) (Is) / (AIs) (RRF) (Vi)$$

Where:

Ax = Peak area

AIs = Internal standard peak area

Is = Amount of internal standard injected (ng)

RRF = Relative response factor

Vi = Volume of extract injected (L) or volume sample purged (mL)

The extract concentration is further reduced by considering the initial sample weight or volume and the final extract volume:

$$\text{Concentration} = (Q) (D) (F) (1000) / (l)$$

Where:

Q = Concentration determined by the data system (mg/L)

D = Dilution factor if needed

F = Final extract volume (mL)

I = Initial sample weight (grams) or volume (mL)

Results are reported in  $\mu\text{g}/\text{L}$  for water samples and  $\mu\text{g}/\text{kg}$  for solid samples. Soil samples are reported on an as received and on a dry-weight basis. The results are reported on Lancaster Labs Analysis Report Forms shown in Appendix A.

**For volatiles by GC and petroleum analysis**, a calibration is performed with a minimum of five levels using either an internal standard calibration or external calibration.

#### A. Internal standard calibration

$$CF = \frac{(Ax)(Cis)}{(Ais)(Cx)} \quad \text{or} \quad CF = \frac{(Hx)(Cis)}{(His)(Cx)}$$

Where:

Ax = Peak area of the compound to be measured in that level of the initial calibration

Hx = Height area of the compound to be measured in that level of the initial calibration

Ais = Peak area of the internal standard

His = Height area of the internal standard

Cis = Concentration of the internal standard.

**NOTE:** On some systems, this is set at 1.

Cx = Concentration of the compound spiked into that level

$$\overline{CF} = \frac{\sum \text{all } CF \text{ in the initial calibration}}{n}$$

Where:

n = Number of levels in the initial calibration

$$\text{Concentration} = \frac{(Ax)(Cis)}{(Ais)(\overline{CF})} \times DF \quad \text{or} \quad \frac{(Hx)(Cis)}{(His)(\overline{CF})} \times DF$$

Where:

Ax = Peak area of the compound to be measured

Hx = Height area of the compound to be measured

Ais = Peak area of the internal standard

His = Height area of the internal standard

Cis = Concentration of the internal standard.

**NOTE:** On some systems, this is set at 1.

$\overline{CF}$  = Average calibration factor

DF = Dilution factor or preparation factor

B. External calibration

$$CF = \frac{Ax}{CF} \times DF \quad \text{or} \quad \frac{Hx}{CF} \times DF$$

$$\text{Concentration} = \frac{Ax}{CF} \times DF \quad \text{or} \quad \frac{Hx}{CF} \times DF$$

When all parameters are defined in A above.

Results are reported in  $\mu\text{g/L}$  for water samples and  $\text{mg/kg}$  for solid samples. Soil samples are reported on an as-received and on a dry-weight basis. Results are reported on Lancaster Labs Analysis Report Forms shown in Appendix A.

For **herbicides and organophate pesticides**, an internal standard calibration is used. The results are calculated from the curve when the individual analyte %RSD is  $>20\%$  and the average of the analyte %RSDs is also  $>20\%$ . Otherwise, the results are calculated using the average response factor.

A. Curve

$$\text{Sample Concentration, } \mu\text{g / kg or } \mu\text{g / L} = \text{Extract Concentration} \times \frac{DF \times FV}{IW \text{ (or IV)}}$$

Where:

Extract Conc., = (peak ht. - Y-intercept)/slope

FV = Final volume

IW or IV = Initial weight, initial volume

DF = Dilution Factor

AF = Additional preparation factors

B. Average response factor

$$\text{Extract Conc., mg / L} = \frac{\text{pk ht in sample}}{\text{Average Response Factor (ARF)}} \times \frac{\text{Int std ht in L3 std}}{\text{Int std ht in sample}}$$

Where:

ARF = Average Response Factor [(RF Calib1 + ... + RF Calib 5)/5]

The results for the **PAHs by HPLC** and **pesticide/PCBs** analyses are calculated using the following equation:

$$\frac{\text{Pk Ht} \times \text{FV} \times \text{DF} \times \text{AF}}{\text{ARF} \times \text{IV (or IW)}} = \text{Concentration (mg / L) or } \mu\text{g / kg}$$

Where:

Pk Ht = Peak height found in sample

ARF = Average response factor (Pk Ht/Concentration of analyte in standard)

FV = Final volume of sample extract (mL)

DF = Dilution factor (where applicable)

IV = Initial volume of sample extracted (mL)

IW = Initial weight of the sample extracted (gm)

AF = Additional factor

If a curve is used, then  $\frac{\text{Pk Ht}}{\text{ARF}}$  is replaced by the following in the preceding equation:

$$\frac{Pk\ Ht - y-intercept}{slope}$$

Results are reported as  $\mu\text{g/L}$  for water samples and  $\mu\text{g/kg}$  for solid samples. Soil samples are reported on an as received and on a dry weight basis. Results are reported on Lancaster Labs Analysis Report Forms shown in Appendix A.

For TPH-GRO and TPH-DRO, an external calibration procedure of at least five levels of standards is used. The resulting point-to-point calibration curve is used by the data system to calculate analyte concentrations. The equations that the data system uses for calculating analyte concentrations are shown below:

$$\text{Concentration} = (Ax / Rf) \times (DF)$$

Where:

Ax = Total peak area in region defined as analyte

DF = Dilution factor

RF = Average response factor from the calibration curve, calculated as shown below:

$$RF = \frac{[(As_1 / Qs_1) + (As_2 / Qs_2) + (As_3 / Qs_3) + (As_4 / Qs_4) + (As_5 / Qs_5) + \dots (As_n / Qs_n)]}{n}$$

Where:

As# = Analyte peak sum area for all components of calibration level #

Qs# = Analyte concentration sum for all components of calibration level #

n = Number of calibration levels

Results are reported in mg/L for water samples and in mg/kg for solid samples. Soil samples are reported on an as-received and on a dry-weight basis.

For DRO, calculation also includes the Factor "F/I"

Where:

F = Final extract volume (mL)

I = Initial sample weight (grams) or volume (mL)

The results for **inorganic** analyses are calculated using the following equation:

$$\text{Concentration} = (A) (D) (E) / (F)$$

Where:

A = The concentration determined by AA, ICP, or FTIR using calibration data programmed into the instrument (mg/L)

D = Dilution factor if needed

E = Final extract volume (mL)

F = Initial sample volume (mL) or weight (gm)

Results are usually reported in mg/L for water samples and in mg/kg for solid samples. Alternate units are available upon request. Soil samples are reported on an as received and on a dry weight basis. The results are reported on Lancaster Labs Analysis Report Forms shown in Appendix A.

The principle criteria used to validate data will be the acceptance criteria described in Sections No. 8 and 11 and protocols specified in laboratory SOPs. Following review, interpretation, and data reduction by the analyst, data is transferred to the laboratory sample management system either by direct data upload from the analytical data system or manually. This system stores client information, sample results, and QC results. A security system is in place to control access of laboratory personnel and to provide an audit trail for information changes. The data is again reviewed by the group leader or another analyst whose function is to provide an independent review and verified on the sample management system. The person performing the verification step reviews all data including quality control information prior to verifying the data. Any errors identified and corrected during the review process are documented and addressed with appropriate personnel to ensure generation of quality data. If data package deliverables have been requested, the laboratory will complete the appropriate forms (see Appendix A) summarizing the quality control information, and transfer copies of all raw data (instrument printouts, spectra, chromatograms, laboratory notebooks, etc.) to the Data Packages Group. This group will combine the information from the various analytical groups and the analytical reports from the laboratory sample management system into one package in the client requested format. This package is reviewed for quality, compliance, and conformance to SOPs and to ensure that all QC goals have been met. Any analytical problems are discussed in the case narrative, which is also included with the data package deliverables.

The validation of the data for quality assurance includes spot checking raw data versus the final report, checking that all pertinent raw data is included and does refer to the samples analyzed, review of all QC results for conformance with the method, and review of the case narrative for description of any unusual occurrences during analysis. This validation is performed using techniques similar to those used by the Sample Management Office for the USEPA's Contract Laboratory Program. The validation performed by the laboratory does not address usability of the data, which usually requires some knowledge of the site. The laboratory will make every attempt to meet the requirements of this QAPP, thus reducing the need to assess usability of the data.

The laboratory sample management system is programmed to accept and track the results of quality control samples including blanks, surrogates, recoveries, duplicates, controls, and reference materials. The computer is programmed with the acceptance criteria for each type of QC sample and will display an out-of-spec message if the data is not within specifications. All data outside of specifications appears on a report to the Quality Assurance Department on the next working day. These are reviewed by the Quality Assurance Department for severity of the problems and trends in the data. The reports are then sent to the analytical groups for the purpose of documenting the corrective action taken. The sample management system also produces control charts and has searching capabilities to aid in data review. The flow of data from the time the samples enter the laboratory until the data is reported are summarized in Table 10-1.

Any data recorded manually will be collected in bound notebooks. All entries will be in ink, with no erasures or white-out being permitted. Any changes in data will be made using a single line to avoid obliteration of the original entry and will be dated and signed. Any data resulting from instrument printouts will be dated and will contain the signature and/or identification of the analyst responsible for its generation. After copies of the data are incorporated into the data package deliverables, the originals will be stored in locked archives at the laboratory for a period of 7 years.

Project files will be created per client/project and will contain chain-of-custody records, analysis requirements, and laboratory acknowledgments which document samples received, laboratory sample number assignment, and analysis requested. Raw data is filed per batch number assignment and laboratory sample number which correlates to the sample receipt documents. When the project is complete, all documentation is archived in a limited access area and retained for 5 years.

**Table 10-1**

<b>Sample and Data Routing at Lancaster Laboratories</b>	
Action	Personnel Involved
Sample received at Lancaster Labs	Sample Administration
Sample is entered onto sample management system (lab ID number assigned, analyses scheduled, chain of custody started, storage location assigned)	Sample Administration
Sample stored in assigned location (refrigerator, freezer, etc.)	Sample Support
Acknowledgment sent to client	Sample Administration
Removed from storage for analysis; necessary aliquot taken and sample returned to storage	Technical Personnel
Analysis is performed according to selected analytical method; raw data recorded, reviewed, and transferred to computer by chemist or technician*	Technical Personnel
Computer performs calculations as programmed according to methods	Data Processing
Chemist or supervisor verifies raw data	Technical Personnel
Data package deliverables are assembled	Data Package Group
Data packages are reviewed prior to mailing	Quality Assurance, Data Package Personnel, and Laboratory Management

\*Analyses requiring the chemist's interpretation may involve manual data reduction prior to entry onto the computer.

## **11. Internal Quality Control Checks**

The particular types and frequencies of quality control checks analyzed with each sample are defined in USEPA SW-846 3rd Edition, Update III, 1996. The quality control checks routinely performed during sample analysis include surrogates, matrix spikes, duplicates, blanks, internal standards, and laboratory control samples. In addition to these checks, some inorganic analyses employ serial dilutions and interference check samples.

Surrogates (used for organic analysis only) - Each sample, matrix spike, matrix spike duplicate, and blank are spiked with surrogate compounds prior to purging and extraction in order to monitor preparation and analysis. Surrogates are used to evaluate analytical efficiency by measuring recovery.

Matrix Spikes - A matrix (soil or water) is spiked with known quantities of specific compounds and subjected to the entire analytical procedure in order to indicate the appropriateness of the method for the matrix by measuring recovery.

Duplicates (matrix spike duplicate - organics and inorganics; duplicate - inorganics) - A second aliquot of a matrix/sample is analyzed at the same time as the original sample in order to determine the precision of the method. Recovery of the original compared to the duplicate is expressed as relative percent differences (RPD).

Blanks (method, preparation) - Blanks are an analytical control consisting of a volume of deionized, distilled laboratory water for water samples, or a purified solid matrix for soil/sediment samples. (Metals use a digested reagent blank with soils.) They are treated with the same reagents, internal standards, and surrogate standards and carried through the entire analytical procedure. The blank is used to define the level of laboratory background contamination.

Internal Standards (used for GC/MS and some GC analysis) - Internal standards are compounds added to every standard, blank matrix, spike, matrix spike duplicate, and sample at a known concentration, prior to analysis. Comparison of the peak areas of the internal standards are used for internal standard quantitation as well as to determine when changes in the instrument response will adversely affect quantification of target compounds.

Serial Dilutions (used for inorganics GFAA and ICP only) - If the analyte concentration is sufficiently high an analysis of a five-fold dilution must agree within 10% of the original determination. If the dilution analysis is not within 10%, a chemical or physical interference effect should be suspected.

Interference Check Sample (ICP) - To verify interelement and background correction factors a solution containing both interfering and analyte elements of known concentration is analyzed at the beginning and end of each analysis run or a minimum of twice per 8 hours.

Laboratory Control Samples - Aqueous and solid control samples of known composition are analyzed using the same sample preparation, reagents, and analytical methods employed for the sample. An LCS is analyzed with every batch.

The results of quality control samples are entered into the computer along with sample results. The computer is programmed to compare the individual values with the acceptance limits. If the results are not within the acceptance criteria, appropriate corrective action is taken where necessary. Management is kept informed by daily reports of QC outliers generated by the computerized system. Monthly reports on results of all QC analyses showing mean and standard deviation will indicate trends or method bias. Control charts are plotted via computer and may be accessed at any time by all analysts.

The tables that follow show the types and frequency of QC performed, along with the acceptance limits and corrective action.

**Table 11-1**  
**Quality Control**  
**GC/MS Volatiles (8260B)**

Type	Acceptance Limits(%)		Frequency	Corrective Action
	WATERS	SOILS		
<b>Surrogates:</b>				
Toluene-d8	88 - 110	81 - 117	Each sample, MS, MSD, LCS, and blank	Reanalyze sample if outside limits; if reanalysis confirms original, document on report and/or case narrative
Bromofluorobenzene	86 - 115	74 - 121		
1,2-Dichloroethane-d4	80 - 120	80 - 120		
Dibromofluoromethane	86 - 118	80 - 120		
<b>Matrix Spikes:</b>	See Table 11.2 for acceptance criteria		Each group ( $\leq 20$ ) of samples per matrix/level	LCS run for compounds outside acceptance limits
Spike all compounds of interest				
<b>Laboratory Control Samples:</b>	See Table 11.2 for acceptance criteria		Each group ( $\leq 20$ ) of samples per matrix/level	Reanalyze LCS and associated samples for compounds outside acceptance limits that are also outside MS/MSD acceptance limits
Spike all compounds of interest				
<b>Matrix Spike Duplicates (RPD):</b>	$\leq 30\%$		Each group ( $\leq 20$ ) of samples per matrix/level	Evaluated by analyst in relationship to other QC results
Spike all compounds of interest				
<b>Blanks:</b>	$\leq$ LOQ for all compounds		Once for each 12-hour time period	Reanalyze blank and associated samples if blank outside limits
<b>Internal Standards:</b>	-50% to +100% of internal standard area of 12-hour STD		Each sample, MS, MSD, LCS, and blank	Reanalyze samples; if reanalysis confirms original, document on report or case narrative
Bromochloromethane				
1,4-Difluorobenzene				
Chlorobenzene-d5	RT Change $\leq 30$ sec.			

Acceptance limits are based on statistical evaluation of laboratory data and are subject to change.

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Table 11-2

**GC/MS Statistical Acceptance Limits for  
 Volatile Compounds (8260B)**

Compound Name	Waters		Soils	
	LCS/LCSD (%)	MS/MSD (%)	LCS/LCSD (%)	MS/MSD (%)
Dichlorodifluoromethane	44-117	35-130	36-136	31-143
Chloromethane	55-119	54-125	48-130	45-134
Vinyl Chloride	62-122	58-132	60-127	58-133
Bromomethane	46-125	44-138	46-134	43-135
Chloroethane	34-127	37-139	30-142	18-148
Trichlorofluoromethane	33-160	34-173	39-135	21-158
1,1-Dichloroethene	57-153	65-147	69-146	67-153
Methylene Chloride	81-118	79-122	69-126	65-136
<i>trans</i> -1,2-Dichloroethene	78-118	79-122	73-126	74-127
1,1-Dichloroethane	84-123	77-132	81-130	79-134
2,2-Dichloropropane	79-130	75-142	79-132	76-138
<i>cis</i> -1,2-Dichloroethene	84-118	84-121	84-123	80-128
Chloroform	82-122	80-126	82-123	78-129
Bromochloromethane	73-117	48-137	69-134	59-138
1,1,1-Trichloroethane	77-137	77-140	84-132	82-135
Carbon Tetrachloride	69-136	68-138	78-129	68-138
1,1-Dichloropropene	86-121	82-128	82-130	82-128
Benzene	82-123	79-127	77-126	76-128
1,2-Dichloroethane	82-126	79-132	81-123	78-125
Trichloroethene	80-122	78-127	81-123	74-130
1,2-Dichloropropane	82-120	79-125	77-127	76-129
Dibromomethane	89-113	84-120	82-119	79-119
Bromodichloromethane	84-118	82-122	80-121	80-120
Toluene	80-126	78-130	74-128	69-140
1,1,2-Trichloroethane	87-120	84-122	81-124	65-144
Tetrachloroethene	78-140	72-145	83-150	74-157
1,3-Dichloropropane	89-122	86-124	79-128	78-125
Dibromochloromethane	88-114	82-119	80-120	76-125
1,2-Dibromoethane	90-114	84-120	84-118	79-119
Chlorobenzene	84-119	84-120	81-121	81-122
1,1,1,2-Tetrachloroethane	90-117	86-121	87-122	85-126
Ethylbenzene	89-124	86-127	86-129	77-138
<i>m+p</i> -Xylene	88-123	83-129	86-128	83-130
<i>o</i> -Xylene	88-123	86-124	86-127	56-159
Styrene	88-121	86-123	84-127	84-124

**Table 11-2**

**GC/MS Statistical Acceptance Limits for  
 Volatile Compounds (8260B)**

Compound Name	Waters		Soils	
	LCS/LCSD (%)	MS/MSD (%)	LCS/LCSD (%)	MS/MSD (%)
Bromoform	80-118	71-124	73-120	68-122
Isopropylbenzene	85-120	77-130	84-127	77-130
1,1,2,2-Tetrachloroethane	73-131	72-132	70-124	59-142
Bromobenzene	86-115	84-119	85-122	78-132
1,2,3-Trichloropropane	84-120	74-131	72-122	66-134
Acetone	64-134	50-142	46-133	29-163
Carbon Disulfide	62-173	74-157	52-165	56-171
<i>n</i> -Propylbenzene	74-127	69-138	76-135	66-145
2-Chlorotoluene	81-124	78-130	78-129	62-151
1,3,5-Trimethylbenzene	72-129	70-136	78-134	67-150
4-Chlorotoluene	82-122	79-129	78-130	75-134
<i>tert</i> -Butylbenzene	84-123	79-129	81-134	73-140
1,2,4-Trimethylbenzene	80-130	79-133	77-138	61-151
<i>sec</i> -Butylbenzene	76-128	71-135	75-136	57-150
<i>p</i> -Isopropyltoluene	78-127	75-133	80-139	71-143
1,3-Dichlorobenzene	83-118	81-121	81-125	82-121
1,4-Dichlorobenzene	82-113	81-116	79-122	78-120
<i>n</i> -Butylbenzene	53-138	54-146	68-147	50-157
1,2-Dichlorobenzene	85-117	84-120	83-125	61-142
1,2-Dibromo-3-chloropropane	63-137	48-152	53-133	46-141
1,2,4-Trichlorobenzene	70-124	58-133	72-130	51-132
Hexachlorobutadiene	35-160	34-166	65-156	24-170
Naphthalene	55-140	43-147	57-126	27-137
1,2,3-Trichlorobenzene	64-130	56-137	66-129	42-132
<i>trans</i> -1,3-Dichloropropene	62-136	84-118	69-131	68-135
4-Methyl-2-pentanone	70-133	58-140	63-123	47-140
<i>cis</i> -1,3-Dichloropropene	86-118	84-119	79-126	79-123
Xylene (Total)	89-123	88-123	88-128	83-135
2-Hexanone	68-139	62-138	60-128	40-154
2-Butanone	47-153	51-148	61-130	47-147

Acceptance limits are based on statistical evaluation of laboratory data and are subject to change.

**Table 11-3**  
**Quality Control**  
**GC/MS Semivolatiles**

Type	Acceptance Limits (%) WATERS      SOILS	Frequency	Corrective Action
<b>Surrogate:</b>			
Nitrobenzene-d5 2-Fluorobiphenyl Terphenyl-d14 Phenol-d6 2-Fluorophenol 2,4,6-Tribromophenol	47 - 114      31 - 126 51 - 106      45 - 113 37 - 119      37 - 130 7 - 74      39 - 108 25 - 88      35 - 108 34 - 125      23 - 125	Each sample, MS, MSD, LCS, and blank	Repeat extraction and analysis; if reanalysis confirms originals, document on report and/or case narrative
<b>Matrix Spikes:</b>	See Table 11-4 for acceptance limits	Each group ( $\leq 20$ ) of samples per matrix/level	Run LCS for compounds outside acceptance limits
Spike all compounds of interest			
<b>Laboratory Control Sample:</b>	See Table 11-4 for acceptance limits	Each group ( $\leq 20$ ) when MS/MSD falls outside established limits	Re-extract and reanalyze LCS and associated samples for compounds outside acceptance limits
Spike all compounds of interest			
<b>Matrix Spike Duplicates (RPD):</b>	$\leq 30\%$	Each group ( $\leq 20$ ) of samples per matrix/level	Evaluated by analyst in relationship to other QC results
Same as for matrix spikes			
<b>Blanks:</b>	$\leq$ LOQ for all compounds	Once per case or group ( $\leq 20$ ) of samples, each matrix, level, instrument	Re-extract and reanalyze blank and associated samples
<b>Internal Standards:</b>			
1,4-Dichlorobenzene-d4 Naphthalene-d8 Acenaphthene-d10 Phenanthrene-d10 Chrysene-d12 Perylene-d12	-50 to +100 of internal standard area of 12-hour STD  RT change $\leq 30$ sec.	Each sample, MS, MSD, LCS, and blank	Reanalyze samples; if reanalysis confirms original, document on report and/or case narrative

Acceptance limits are based on statistical evaluation of laboratory data and are subject to change.

Table 11-4

Semivolatile Matrix Spike/  
 Matrix Spike Duplicate Sample Recovery

Compound Name	Water		Soil	
	LCS/LCSD (%)	MS/MSD (%)	LCS/LCSD (%)	MS/MSD (%)
N-Nitrosodimethylamine	46-81	42-84	47-109	48-113
Phenol	5-83	5-112	49-105	29-112
bis (2-Chloroethyl) ether	66-106	40-128	53-109	12-158
2-Chlorophenol	62-107	56-112	55-107	36-124
1,3-Dichlorobenzene	45-91	44-99	53-103	31-123
1,4-Dichlorobenzene	45-94	34-108	52-103	20-124
1,2-Dichlorobenzene	52-97	32-121	56-107	44-113
bis (2-Chloroisopropyl) ether	43-118	38-118	38-117	36-121
N-Nitroso-di-n-propylamine	62-118	58-120	50-124	38-140
Hexachloroethane	40-84	40-113	52-108	40-113
Nitrobenzene	61-113	43-127	56-110	40-125
Isophorone	66-113	42-134	57-114	46-127
2-Nitrophenol	67-104	64-108	59-107	40-125
2,4-Dimethylphenol	52-99	33-107	39-108	32-119
bis (2-Chloroethoxy) methane	64-103	57-108	56-103	40-121
2,4-Dichlorophenol	65-98	61-101	59-100	39-135
1,2,4-Trichlorobenzene	52-93	50-98	57-104	44-125
Naphthalane	58-99	50-106	60-97	41-115
Hexachlorobutadiene	24-86	24-98	56-115	35-116
4-Chloro-3-methylphenol	60-111	54-115	56-108	22-142
Hexachlorocyclopentadiene	17-80	15-83	27-113	1-127
2,4,6-Trichlorophenol	66-105	43-121	62-106	37-127
2-Chloronaphthalene	61-103	60-106	60-106	60-118
Dimethylphthalate	1-90	11-107	61-104	44-112
Acenaphthylene	64-100	61-103	62-101	42-119
2,6-Dinitrotoluene	64-112	45-128	58-113	39-136
Acenaphthene	61-100	60-101	61-100	47-114
2,4-Dinitrophenol	25-124	6-120	29-117	1-126
4-Nitrophenol	3-83	1-93	44-110	5-132
2,4-Dinitrotoluene	64-112	45-128	58-113	39-136
Diethylphthalate	30-99	46-106	59-104	43-114
4-Chlorophenyl-phenylether	62-104	58-106	52-110	41-115
Fluorene	61-108	59-110	59-109	59-121

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**Table 11-4**

**Semivolatile Matrix Spike/  
 Matrix Spike Duplicate Sample Recovery**

Compound Name	Water		Soil	
	LCS/LCSD (%)	MS/MSD (%)	LCS/LCSD (%)	MS/MSD (%)
4,6-Dinitro-2-methylphenol	43-120	38-116	42-107	5-128
N-Nitrosodiphenylamine	64-103	44-124	60-106	28-144
1,2-Diphenylhydrazine	57-123	46-133	52-129	31-149
4-Bromophenyl-phenylether	69-102	63-106	61-110	53-125
Hexachlorobenzene	62-109	48-118	52-123	31-135
Pentachlorophenol	46-114	14-130	42-108	14-131
Phenanthrene	68-102	64-105	62-107	54-120
Anthracene	66-101	62-103	62-105	42-119
Di-n-butylphthalate	61-105	60-110	59-114	35-118
Fluoranthene	66-106	61-109	58-110	26-137
Benzidine	1-116	1-125	1-74	1-70
Pyrene	58-112	55-114	52-115	52-115
Butylbenzylphthalate	48-105	53-110	58-119	45-133
3,3'-Dichlorobenzidine	37-104	37-106	15-94	1-125
Benzo(a)anthracene	69-101	64-103	63-106	33-135
Chrysene	67-101	63-104	60-107	9-153
bis(2-Ethylhexyl)phthalate	64-113	39-131	8-158	8-158
Di-n-octylphthalate	59-118	52-121	54-127	41-146
Benzo(b)fluoranthene	64-101	54-108	59-105	24-148
Benzo(k)fluoranthene	67-105	59-112	63-108	41-126
Benzo(a)pyrene	65-101	60-102	61-107	21-139
Indeno(1,2,3-cd)pyrene	59-111	55-114	55-111	28-127
Dibenz(a,h)anthracene	66-117	57-124	60-117	11-152
Benzo(g,h,i)perylene	52-113	12-133	55-115	49-121
Aniline	53-99	33-113	30-97	1-126
Acetophenone	68-136	64-137	59-134	31-161
Ethyl methanesulfonate	50-123	57-115	65-117	38-142
Methyl methanesulfonate	43-114	54-106	66-122	1-164
N-nitrosodiethylamine	37-135	37-135	37-135	37-135
N-nitrosomethylethylamine	58-140	73-132	78-128	1-187
N-nitrosomorpholine	49-120	50-118	78-109	1-158
N-nitrosopiperidine	52-123	73-108	78-105	1-158
N-nitrosopyrrolidine	1-152	60-121	77-113	1-160

**Table 11-4**

**Semivolatile Matrix Spike/  
 Matrix Spike Duplicate Sample Recovery**

Compound Name	Water		Soil	
	LCS/LCSD (%)	MS/MSD (%)	LCS/LCSD (%)	MS/MSD (%)
2-picoline	26-135	28-127	29-129	1-142
<i>o</i> -Toluidine	60-94	1-145	12-89	1-128
Benzyl Alcohol	59-108	44-117	62-115	9-146
2-chlorophenol	62-107	56-112	55-107	36-124
2-methylphenol	55-96	25-122	57-101	20-130
3- or 4-methylphenol	48-99	15-130	48-116	22-138
Pyridine	38-82	31-85	34-92	21-96
2,6-dichlorophenol	64-107	58-110	62-109	1-156
1,3-dinitrobenzene	62-111	26-142	61-109	1-150
Hexachloropropene	70-130	70-130	70-130	70-130
Isosafrole	9-76	10-76	14-72	1-100
1,4-naphthoquinone	70-130	70-130	70-130	70-130
N-nitrosodi- <i>n</i> -butylamine	48-120	72-101	75-103	1-168
1,4-phenylenediamine	70-130	70-130	70-130	70-130
Safrole	4-122	18-109	30-109	1-136
1,2,4,5-tetrachlorobenzene	67-105	9-160	61-113	30-141
O,O,O-triethylphosphorothioate	46-118	53-119	67-103	52-126
a,a-dimethylphenethylamine	4-100	4-100	4-100	4-100
4-chloroaniline	34-101	9-119	1-102	1-123
2-methylnaphthalene	62-98	57-103	60-102	45-112
2-nitroaniline	58-112	60-111	54-111	8-154
2,4,5-trichlorophenol	67-103	40-122	63-107	18-139
2,3,4,6-tetrachlorophenol	21-137	19-109	62-103	1-134
Dimethoate	1-59	1-83	23-79	1-123
1-naphthylamine	1-179	1-140	1-99	1-147
2-naphthylamine	2-162	1-173	1-100	1-93
5-nitro- <i>o</i> -toluidine	70-130	70-130	70-130	70-130
Pentachlorobenzene	8-162	34-137	69-100	1-148
Phenacetin	7-180	10-177	69-105	1-152
Tetraethyl dithiopyrophosphate	41-125	44-132	62-111	1-193
1,3,5-trinitrobenzene	70-130	70-130	70-130	70-130
Diallate (trans/cis)	48-128	69-113	23-79	1-123
Diphenylamine	64-103	44-124	60-106	28-144

Table 11-4

Semivolatile Matrix Spike/  
Matrix Spike Duplicate Sample Recovery

Compound Name	Water		Soil	
	LCS/LCSD (%)	MS/MSD (%)	LCS/LCSD (%)	MS/MSD (%)
Thionazin	60-114	61-114	63-110	3-147
Dibenzofuran	67-99	64-100	62-102	38-120
3-nitroaniline	40-108	43-105	9-110	8-114
4-nitroaniline	37-120	1-170	55-116	55-116
2-acetylaminofluorene	70-130	70-130	70-130	70-130
4-aminobiphenyl	1-174	28-130	1-46	1-112
Chlorobenzilate	1-132	24-144	9-223	6-198
p-(dimethylamino) azobenzene	14-184	2-187	1-186	1-247
7,12-dimethylbenz(a) anthracene	87-184	83-184	99-213	1-286
3,3'-dimethylbenzidine	1-149	1-153	1-137	1-110
Isodrin	51-110	52-109	66-117	1-145
3-methylcholanthrene	71-135	66-132	58-169	1-206
4-nitroquinoline-1-oxide	70-130	70-130	70-130	70-130
Pentachloronitrobenzene	68-108	58-112	68-115	10-146
Pronamide	1-138	3-123	1-132	1-153
Methapyrilene	25-151	24-154	35-138	1-142

Acceptance limits are based on statistical evaluation of laboratory data and are subject to change.

**Table 11-5**

**Quality Control  
 Pesticides/PCBs**

Type	Acceptance Limits (%) WATERS      SOILS		Frequency	Corrective Action
<b>Surrogate:</b>				
Organochlorine Pesticides; DCB TCMX	60 - 120 60 - 120	50 - 120 50 - 120	Added to each sample, MS/MSD, blank, LCS/LCSD during the extraction phase	At least one surrogate must be in spec unless matrix related problems are evident; if matrix related problems are evident, report results and comment in case narrative
Herbicides; DCAA	60 - 120	50 - 120		
Organophosphate Pesticides; 2NMX	60 - 120	50 - 120		
<b>Matrix Spikes:</b>				
Organochlorine Pesticides; Spike all compounds of interest, except PCBs, chlordane, and toxaphene	See Table 11-6		Each extraction group ( $\leq 20$ ) of samples per matrix/level	Run LCS for compounds outside acceptance limits
Herbicides (all compounds of interest); 2,4-D 2,4,5-TP 2,4,5-T Dinoseb	52 141 51-126 59-130 4-96	58 - 147 44 - 153 40 - 145 1 - 33		
Organophosphate Pesticides; Phorate Disulfoton Famphur Methyl Parathion Ethyl Parathion	63 - 139 65 - 125 61 - 155 51 - 152 62 - 120	42 - 146 1 - 119 40 - 174 1 - 116 1 - 140		
<b>PCBs:</b>				
1016	43 - 126	64 - 127		
1260	51 - 126	69 - 123		

**Table 11-5**

**Quality Control  
 Pesticides/PCBs**

Type	Acceptance Limits (%) WATERS      SOILS	Frequency	Corrective Action
<b>Laboratory Control Sample:</b>			
Organochlorine Pesticides; Spike all compounds of interest, except PCBs, chlordane, and toxaphene	See attached Table 11-6	Each group (<20) when MS/MSD falls outside established limits	Re-extract and reanalyze LCS and associated samples for compounds outside acceptance limits
Herbicides; 2,4-D 2,4,5-TP 2,4,5-T Dinoseb	52 141      58 - 147 51-126      44 - 153 59-130      40 - 145 4-96      1 - 33		
Organophosphate Pesticides; Phorate Disulfoton Famphur Methyl Parathion Ethyl Parathion	63 - 139      42 - 146 65 - 125      1 - 119 61 - 155      40 - 174 51 - 152      1 - 116 62 - 120      1 - 140		
<b>Matrix Spike Duplicates (RPD):</b>	Water ≤30%  Soils ≤50%	Each group ( 20) of samples per matrix/level	Evaluated by analyst in relationship to other QC results
Organochlorine Pesticides; Spike all compounds of interest, except PCBs, chlordane, and toxaphene			
Herbicides; 2,4-D 2,4,5-TP 2,4,5-T Dinoseb			
Organophosphate Pesticides; Phorate Disulfoton Famphur Methyl Parathion Ethyl Parathion			

Table 11-5

Quality Control  
Pesticides/PCBs

Type	Acceptance Limits (%) WATERS      SOILS	Frequency	Corrective Action
<b>Blanks:</b>	≤LOQ for all compounds	Once per case or extraction group ( $\leq 20$ ) of samples, each matrix, level, instrument	Inject a hexane or solvent blank first to be sure the analytical system is clean then reinject the blank itself. If the reinjected blank is acceptable, any samples extracted with this blank should be reinjected if they, too, contain the analyte which was contaminating the blank. If the reinjected blank is unacceptable, any affected samples must be reextracted.

Acceptance limits are based on statistical evaluation of compiled laboratory data and are subject to change.

**Table 11-6**  
**Quality Control**  
**Pesticides/PCBs**

**Organochlorine Pesticides Spike Acceptance Limits**

Compound Name	Matrix Spike and Laboratory Control Sample Limits	
	Waters (%)	Soils (%)
Lindane	62-132	51-142
Heptachlor	46-120	60-137
Aldrin	41-115	49-145
DDT	59-135	60-138
Dieldrin	61-122	59-130
Endrin	68-148	69-152
Methoxychlor	60-164	52-174
Delta-BHC	64-132	44-145
Heptachlor Epoxide	64-126	59-136
Endosulfan I	45-132	46-135
Endrin Aldehyde	52-142	28-166
Alpha-BHC	60-133	48-144
Beta-BHC	64-122	34-145
DDE	55-126	61-135
DDD	60-134	53-141
Endosulfan II	52-130	48-132
Endosulfan Sulfate	67-132	40-150

Acceptance limits are based on statistical evaluation of compiled laboratory data and are subject to change.

**Table 11-7**

**Quality Control  
 Volatiles by GC**

Type	Acceptance Limits (%)		Frequency	Corrective Action
	WATERS	SOILS		
<b>Surrogates:</b>				
Halocarbons; 1-Bromo-4-chlorobenzene (Hall)	70 - 130	70 - 130	Each sample, MS, MSD, and blank	Results would not be reported if the surrogate recovery is outside the limits unless matrix related problems are evident
Aromatics; 1-Bromo-4-chlorobenzene (Hall)	70 - 130	70 - 130		
Halocarbons/Aromatics; 1-Bromo-4-chlorobenzene (Hall)	70 - 130	70 - 130		
Non-halogenated; 2-hexanone (FID)	75 - 125	70 - 130		
<b>Matrix Spikes:</b>	See Table 11-8 for acceptance limits		Each group of samples of similar matrix/level ( $\leq 20$ ) each method	Analyze LCS for compounds outside of acceptance limits
Spike all compounds of interest except:				
<b>Laboratory Control Sample/Check Standard:</b>	See Table 11-8 for acceptance limits		Each group ( $\leq 20$ ) when MS/MSD falls outside established limits	Reanalyze LCS and associated samples for compounds outside of acceptance limits
Spike all compounds of interest except				
Dichlorodifluoromethane <i>trans</i> -1,2-Dichloroethene <i>trans</i> -1,3-Dichloropropene 1,1,2-Trichloroethane <i>cis</i> -1,3-Dichloropropene 1,1,2,2-Tetrachloroethane				

Table 11-7

Quality Control  
Volatile by GC

Type	Acceptance Limits (%)		Frequency	Corrective Action
	WATERS	SOILS		
<b>Internal Standard:</b> Fluorobenzene	80 - 120	80 - 120	Each sample, MS, MSD, blank	Reanalyze samples; if reanalysis confirms original, document on report and/or case narrative
<b>Matrix Spike Duplicate (RPD):</b>  Same compounds as matrix spikes	See Table 11-9 for acceptance limits		Each group ( $\leq 20$ ) of samples per matrix/level	Evaluated by analyst in relationship to other QC results
<b>Blanks:</b>	$\leq$ LOQ for all compounds		Every 12 hours	Reanalyze blank and associated samples if blank is outside limits

Acceptance limits are based on statistical evaluation of laboratory data and are subject to change.

**Table 11-8**

**Quality Control Volatiles by GC**

**Spike Acceptance Limits**

Compound Name	MS/MSD/LCS (%) Waters	MS/MSD/LSD (%) Soils	Max. % RPD Waters	Max. % RPD Soils
Chloromethane	18-134	40-115	30	30
Bromomethane	54-134	50-115	30	30
Vinyl Chloride	49-145	39-115	30	30
Chloroethane	50-133	49-115	30	30
Methyl Chloride	67-134	66-115	30	30
Trichlorofluoromethane	45-128	35-115	30	30
1,1-Dichloroethene	76-135	53-115	30	30
1,1-Dichloroethane	81-127	82-115	30	30
1,2-Dichloroethene (cis/trans)	81-132	67-115	30	30
Chloroform	82-124	83-115	30	30
1,2-Dichloroethane	82-120	87-115	30	30
1,1,1-Trichloroethane	80-129	74-115	30	30
Carbon Tetrachloride	79-135	71-115	30	30
Bromodichloromethane	74-125	85-115	30	30
1,2-Dichloropropane	82-121	80-115	30	30
Trichloroethene (PID)	77-132	60-118	30	30
Dibromochloromethane	64-127	88-115	30	30
Bromoform	56-139	84-115	30	30
Tetrachloroethene	77-138	78-115	30	30
Chlorobenzene (PID)	83-119	78-108	30	30
Benzene (PID)	77-125	76-105	30	30
Toluene (PID)	69-126	72-109	30	30
Ethylbenzene (PID)	73-125	75-109	30	30
<i>o</i> -Dichlorobenzene (Hall)	72-135	70-130	30	30
<i>m</i> -Dichlorobenzene (Hall)	92-126	84-101	30	30
<i>p</i> -Dichlorobenzene (PID)	81-126	82-113	30	30
<i>o</i> -Xylene	82-122	77-107	30	30
<i>m</i> + <i>p</i> -Xylene	82-123	77-108	30	30
Total Xylenes	82-123	77-108	30	30

Acceptance limits are based on statistical evaluation of compiled laboratory data and are subject to change.

**Table 11-9**

**Petroleum Analysis  
 Acceptance Criteria**

Type	Acceptance Limits (%) WATERS      SOILS		Frequency	Corrective Action
<b>Surrogate:</b>  $\alpha\alpha\alpha$ -Trifluorotoluene	70 - 130      20 - 130		Each sample, MS, MSD, LCS, and blank	Reanalyze sample if outside limits; if reanalysis confirms original, document a report and/or case narrative
<b>Matrix Spike:</b>  Spike all compounds of interest	See Table 11-10		Each group ( $\leq 20$ ) of samples per matrix/level	Run LCS for compounds outside of acceptance limits
<b>Laboratory Control Sample:</b>  Spike all compounds of interest	See Table 11-10		Each group ( $\leq 20$ ) of samples per matrix/level	Reanalyze LCS and associated samples for compounds outside acceptance limits that are also outside MS/MSD acceptance limits
<b>Matrix Spike Duplicates (RPD):</b>	$\leq 30\%$		Each group ( $\leq 20$ ) of samples per matrix/level	Evaluated by an analyst in relationship to other QC results
<b>Blanks:</b>	$\leq$ LOQ for all compounds		At least one per 20 samples	Reanalyze blank and associated samples if blank is outside limits
<b>Internal Standards:</b>  1-Chloro-3-fluorobenzene	-50% to +100% if internal standard area		Each sample, MS, MSD, LCS, and blank analyzed on the PID	Reanalyze samples; if reanalysis confirms original, document on report or case narrative

Table 11-10

Petroleum Analysis

Compound Name	MS% Water	MS% Soil	Max. % RPD Water	Max. % RPD Soil	LCS%	
					Water	Soil
Benzene	78-138	70-130	30	30	78-138	70-130
Toluene	78-118	70-130	30	30	78-118	70-130
Ethylbenzene	77-119	70-130	30	30	77-119	70-130
Total Xylenes	76-116	70-130	30	30	76-116	70-130
MTBE	76-144	70-130	30	30	76-144	70-130
Naphthalene	83-112	70-130	30	30	83-112	70-130

Acceptance limits are based on statistical evaluation of laboratory data and are subject to change.

**Table 11-11**

**Quality Control  
 PAHs by HPLC (8310)**

Type	Acceptance Limits (%) WATERS      SOILS		Frequency	Corrective Action
<b>Surrogate:</b>				
Nitrobenzene or Triphenylene	60 - 120 60 - 120	50 - 120 50 - 120	Added to each sample, MS/MSD, blank, LCS/LCSD during the extraction phase	Surrogate must be in spec unless matrix related problems are evident. If matrix related problems are evident, report results and comment in case narrative.
<b>Matrix Spike:</b>	See Table 11-12		Each group ( $\leq 20$ ) of samples per matrix/level	Run LCS for compounds outside acceptance limits
Spike all compounds of interest				
<b>Laboratory Control Sample:</b>	See Table 11-12		Each group ( $\leq 20$ ) when MS/MSD falls outside established limits	Re-extract and reanalyze LCS and associated samples for compounds outside acceptance limits
Spike all compounds of interest				
<b>Matrix Spike Duplicates (RPD):</b>	$\leq 30\%$	$\leq 50\%$	Each group ( $\leq 20$ ) of samples per matrix/level	Evaluated by analyst in relationship to other QC results
Spike all compounds of interest				
<b>Blanks:</b>	$\leq$ LOQ for all compounds		Once per case or extraction group ( $\leq 20$ ) of samples, each matrix, level, instrument	Inject a hexane or solvent blank first to be sure the analytical system is clean then reinject the blank itself. If the reinjected blank is acceptable, any samples extracted with this blank should be reinjected, if they, too, contain the analyte which was contaminating the blank. If the reinjected blank is unacceptable, any affected samples must be re-extracted.

Acceptance limits are based on statistical evaluation of compiled laboratory data and are subject to change.

Table 11-12

Quality Control

PAHs by HPLC Spike Acceptance Limits

Compound Name	Matrix Spike and Laboratory Control Sample Limits	
	Waters (%)	Soils (%)
Naphthalene	37-120	31-162
Acenaphthylene	41-135	39-166
Acenaphthene	38-135	38-170
Fluorene	41-140	40-175
Phenanthrene	48-152	47-176
Anthracene	42-143	38-164
Fluoranthene	48-155	48-167
Pyrene	51-146	42-162
Benzo(a)anthracene	52-146	51-148
Chrysene	56-145	52-148
Benzo(b)fluoranthene	59-141	55-142
Benzo(k)fluoranthene	60-137	56-139
Benzo(a)pyrene	42-158	33-156
Dibenzo(a,h)anthracene	49-142	47-139
Benzo(g,h,i)perylene	46-148	40-150
Indeno(1,2,3-cd)pyrene	64-134	50-146

Acceptance limits are based on statistical evaluation of compiled laboratory data and are subject to change.

**Table 11-13**

**Quality Control  
 TPH-DRO**

Type	Acceptance Limits(%)		Frequency	Corrective Action
	WATERS	SOILS		
<b>Surrogate:</b>				
Chlorobenzene o-Terphenyl	50 - 150 50 - 150	50 - 150 50 - 150	Added to each sample, MS/MSD, blank, LCS/LCSD during the extraction phase	At least one surrogate must be in spec unless matrix related problems are evident. If matrix related problems are evident, report results and comment in case narrative.
<b>Matrix Spike:</b>				
No. 2 Fuel:  8015B API California	60 - 120	60 - 120	Each group ( $\leq 20$ ) of samples per matrix/level	Reinject if surrogates appear low. If still out of spec, evaluate for matrix effect. If matrix effect, accept based on LCS data. If no matrix effect, repeat batch.
<b>Laboratory Control Sample:</b>				
No. 2 Fuel	60 - 120	60 - 120	Each group $\leq 20$	Reinject if surrogates appear low. If still out of spec, repeat batch.
<b>Laboratory Control Duplicates (RPD):</b>				
No. 2 Fuel	$\leq 20\%$ for waters and soils		Each group ( $\leq 20$ ) of samples per matrix/level	Evaluated by analyst in relationship to other QC results
<b>Blanks:</b>	$\leq$ LOQ for analyte		Once per case or extraction group ( $\leq 20$ ) of samples, each matrix, level, instrument	Inject a solvent blank first to be sure the analytical system is clean then reinject the blank itself. If the reinjected blank is acceptable, any samples extracted with this blank should be reinjected, if they, too, contain the analyte which was contaminating the blank. If the reinjected blank is unacceptable, any affected samples must be re-extracted.

**Table 11-14**

**Quality Control  
 TPH-GRO**

Type	Acceptance Limits(%) WATERS      SOILS		Frequency	Corrective Action
<b>Surrogate:</b>			Each sample, MS/MSD, and blank	Results would not be reported if the surrogate recovery is outside the limits unless matrix related problems are evident
1-Chloro-3-fluorobenzene (FID) trifluorotoluene (FID)	70 - 130 70 - 130	70 - 130 70 - 130		
<b>Matrix Spike:</b>			Each group of samples of similar matrix/level ( $\leq 20$ ) each method	Analyze LCS
Gasoline standard  8015B	70 - 130	70 - 130		
<b>Laboratory Control Sample</b>			Each group ( $\leq 20$ ) when MS/MSD falls outside established limits	Reanalyze LCS and associated samples if MS/MSD fails
Gasoline standard	70 - 130	70 - 130		
<b>Matrix Spike Duplicate (RPD):</b>	Maximum RPD 30%	Maximum RPD 30%	Each group ( $\leq 20$ ) of samples per matrix/level	Evaluated by analyst in relationship to other QC results
Same compounds as matrix spikes				
<b>Blanks:</b>	$\leq$ LOQ for analytes		At least one per 20 samples	Reanalyze blank and associated samples if blank is outside limits

**Table 11-15**

**Quality Control  
 Inorganics**

Type	Acceptance Limits (%) WATERS      SOILS	Frequency	Corrective Action
<b>Matrix Spikes:</b>	<b>AA:</b> 80% to 120% except where sample conc. exceeds spike conc. by $\geq 4\times$  <b>ICP:</b> 75% to 125% except where sample conc. exceeds spike conc. by $\geq 4\times$	Each group of samples of similar matrix/level ( $\leq 20$ ) each method	Analyze post-digestion spike sample
<b>Matrix Spike Duplicate (RPD):</b>	Same as above  $\pm 20\%$ RPD	Each group of samples of similar matrix/level ( 20) each method	Analyze post-digestion spike sample if not already run for MS, flag the data
<b>Duplicates (RPD):</b>	$\pm 20\%$ RPD for sample values $\geq 5\times$ LOQ	Each group of samples of similar matrix/level ( $\leq 20$ ) each method	Flag the data
<b>Blanks:</b>  Initial Calibration (ICB) Continuing Calibration (CCB)	<b>ICP:</b> $<3\times$ IDL or blank $<1/10$ conc. of action level and samples not $\pm 10\%$ of action level  <b>AA:</b> $<\text{LOQ}$	Each wavelength immediately after calibration verification at 10% frequency or every 2 hours (beginning and end of run min.)  Each SDG or batch ( $\leq 20$ samples)	Correct problem, recalibrate, and rerun
Preparation Blank	$\leq \text{LOQ}$  $>\text{LOQ}$ then lowest conc. in sample must be $20\times$ blk. conc.		Redigest and reanalyze blank and associated samples if sample result $<20\times$ blank result

Table 11-15

Quality Control  
Inorganics

Type	Acceptance Limits (%) WATERS      SOILS	Frequency	Corrective Action
<b>Serial Dilutions (ICP &amp; GFAA only):</b>	Within $\pm 10\%$ of the original determination	Each group of ( $\le 20$ ) of similar matrix/level	Flag the data
<b>Interference Check Sample (ICP only):</b>	$\pm 20\%$ of the true value for the analytes	Each wavelength after Initial Calibration Verification at beginning and end of the run or min. of 2x per 8 hour	Recalibrate the instrument
<b>Laboratory Control Sample:</b>	Aqueous 80% to 120% (except Ag and Sb) Solids commercial certified standard advisory range See Table 11-17	Each SDG or batch ( $\le 20$ samples), each method	Redigest and reanalyze LCS and associated samples
<b>Post Digestion Spike:</b>	<b>AA:</b> 85% to 115% <b>ICP:</b> 75% to 125%	When matrix spikes are outside 80% to 120% range	Flag the data
<b>Analytical Spike:</b>	85% to 115%	One per 20 field samples	See Table 11-16A

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**Figure 11-1A**

## SW846 Method 7000A GFAA Batch QC Decision Tree

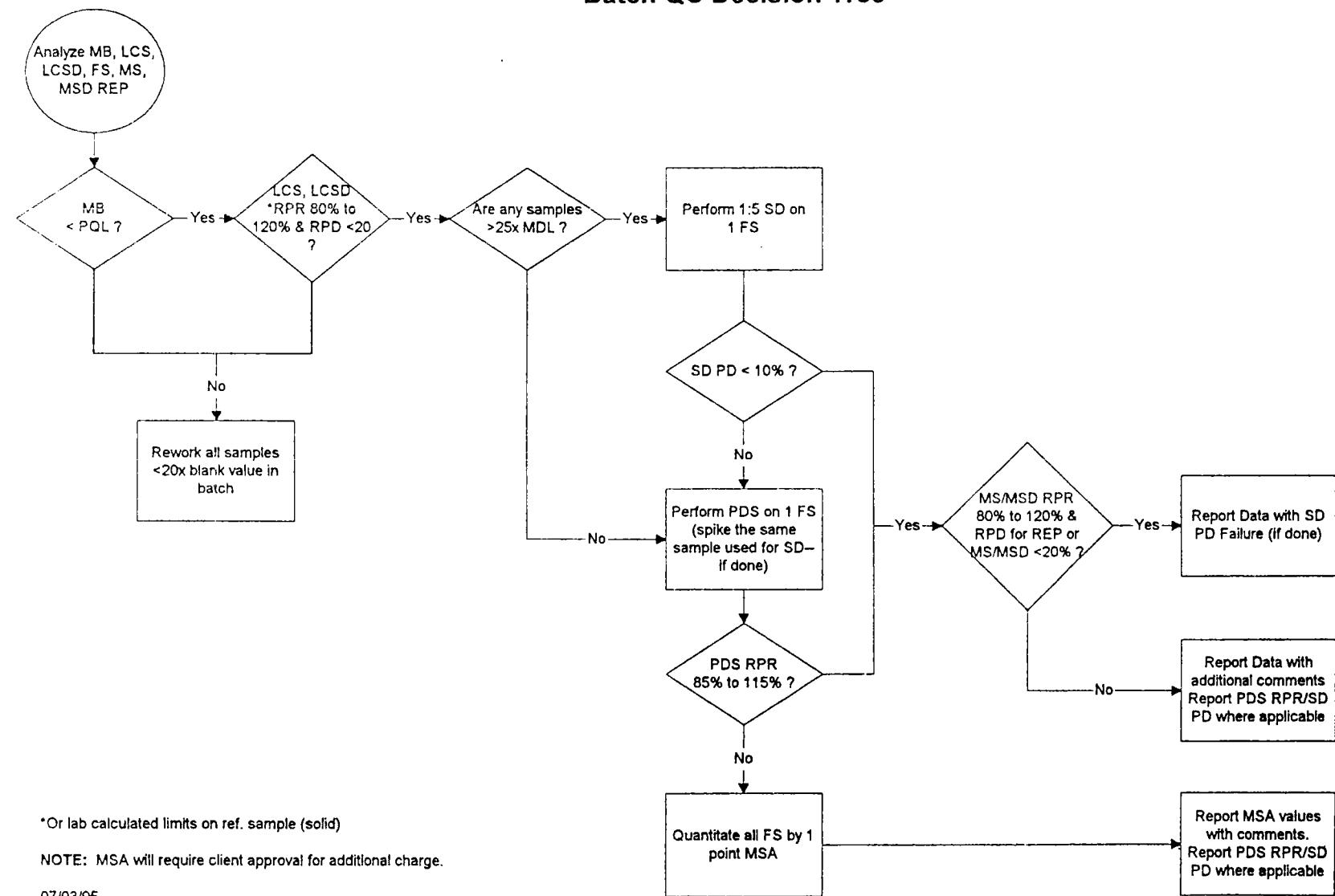


Table 11-16



## Certification

PriorityPollutnT™/CLP Inorganic Soils		Quality Control Standards	
Catalog No	PPS-46	Lot No	232
<b>Parameter</b>		<b>Certified Value</b>	<b>Performance Acceptance Limits™</b>
TRACE METALS PriorityPollutnT™ (Catalog No 640)		mg/Kg	mg/Kg
aluminum	4500	2820 - 6190	
antimony	38.2	7.41 - 81.3	
arsenic	103	73.4 - 133	
barium	170	126 - 214	
beryllium	120	91.2 - 148	
boron	102	68.8 - 135	
cadmium	88.8	66.9 - 111	
calcium	1990	1440 - 2530	
chromium	133	104 - 163	
cobalt	72.9	56.3 - 89.5	
copper	85.0	68.0 - 102	
iron	7580	4270 - 10900	
lead	86.4	58.0 - 115	
magnesium	1180	810 - 1560	
manganese	187	147 - 228	
mercury	2.86	1.78 - 3.94	
molybdenum	96.1	69.8 - 122	
nickel	95.5	72.1 - 119	
potassium	2160	1580 - 2740	
selenium	129	93.9 - 165	
silver	117	84.5 - 150	
sodium	392	258 - 526	
strontium	95.6	65.1 - 126	
thallium	105	55.4 - 155	
tin	67.1	44.1 - 90.1	
titanium	216	129 - 303	
vanadium	73.5	47.0 - 100	
zinc	71.8	53.4 - 90.2	
CYANIDE PriorityPollutnT™ (Catalog No 541)		mg/Kg	mg/Kg
total cyanide	138	70.9 - 204	

The **Trace Metals Certified Values** are equal to the mean recoveries for each parameter as determined in an interlaboratory round robin study. The standard was digested using various EPA methods such as Method 3050, 3051, etc. and the digest analyzed by ICP and atomic absorption spectroscopy.

The **Cyanide Certified Value** is equal to the mean recovery as determined in an interlaboratory round robin study. The standard was distilled and analyzed following the procedure outlined in Method 9010, SW-846.

The **Performance Acceptance Limits (PALs™)** are listed as guidelines for acceptable analytical results given the limitations of the USEPA methodologies commonly used to determine these parameters and closely approximate the 95% confidence interval. The PALs™ are based on data generated by your peer laboratories in ERA's InterLab™ programs. If your result falls outside of the PALs™, ERA recommends that you investigate potential sources of error in your preparation and/or analytical procedures. For further technical assistance, call ERA at 1-800-372-0122.

For users of internal standards, ERA has determined that scandium is present in this soil at 2.2 mg/Kg and that yttrium is present at 17 mg/Kg.

Table 11-17

Quality Control Acceptance Criteria

Parameter	Blank	Spike Recovery (%)	Duplicate RPD (%)	Lab Control Recovery
Phenols	<LOQ	53 - 126	≤20	70 - 116
Total Petroleum Hydrocarbons	<LOQ	61 - 110	≤34	66 - 106%
TOC	<LOQ	75 - 125	≤20	Commercial certified standard advisory range
TOX	<LOQ	75 - 125	≤20	90 - 110
Sulfide	<LOQ	76 - 114	≤20	85 - 110

**Corrective Action:** If either the LCS or Blank are outside the criteria, the QC and associated samples will be reprepped and reanalyzed.

Maximum batch size is 20 field samples.

Acceptance limits are based on statistical evaluation of compiled laboratory data and/or the referenced method and subject to change.

**12. Performance and System Audits**

System audits are conducted on each department at Lancaster Laboratories by members of the Quality Assurance Department. The audits include checks on methodology, reagent preparation, equipment calibration and maintenance, quality control results, and training of personnel. The results of the audits and corrective action, where necessary, are communicated to laboratory personnel and management by means of a written report. Audits by outside organizations including clients, regulatory personnel, and the USEPA are permitted by arrangement with the Quality Assurance Department.

The Quality Assurance Department reviews summaries of the quality control data entered onto the computerized sample management system by analysts. Control charts and statistics are reviewed for trends which may indicate problems with the analytical data. In this way, small problems are identified before they have any significant impact on laboratory results.

Performance audits consist of both intralaboratory and interlaboratory check samples. QC samples from commercial suppliers are analyzed quarterly to assess laboratory accuracy including a double blind program. The Laboratory also participates in a number of interlaboratory performance evaluation studies which involve analysis of samples with concentrations of analytes that are known to the sponsoring organization, but unknown to the laboratory. Inorganics, pesticide/herbicides, trihalomethanes, volatile organic compounds, semivolatile organic compounds, and traditional wet chemistry analyses are analyzed by Lancaster Labs for studies conducted by the USEPA and the New York Department of Health. Lancaster Labs has participated in the USEPA Contract Laboratory Program which provides laboratory analysis in support of the Superfund program. Part of maintaining this contract includes analysis of quarterly blind samples. Representative results from some of these studies are attached to this section.

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Performance Evaluation Report USEPA Water Supply Study WS041					Report: PE005 Page: 1 Date: 30SEP98
Participant ID: PA00009 <i>Lancaster Labs</i>		Type: OTHER	Requesting Office: NH		
Sample Number	Reported Value	True Value*	Acceptance Limits	Performance Evaluation	
<b>TRACE METALS IN MICROGRAMS PER LITER:</b>					
001-ARSENIC	001	67.6	65.6	58.2- 72.9	Accept.
003-CADMIUM	001	17.7	18.2	14.6- 21.8	Accept.
004-CHROMIUM	001	55.2	55.5	47.2- 63.8	Accept.
007-SELENIUM	001	46.8	46.3	37- 55.6	Accept.
091-COPPER	001	692.	702	632- 772	Accept.
140-ANTIMONY	001	31.8	31.4	22- 40.8	Accept.
141-BERYLLIUM	001	2.44	2.58	2.19- 2.97	Accept.
142-NICKEL	001	348.	352	299- 405	Accept.
143-THALLIUM	001	3.59	3.50	2.45- 4.55	Accept.
226-BORON	002	819.	790	736- 874	Accept.
236-MANGANESE	002	182.	183	167- 196	Accept.
237-MOLYBDENUM	002	78.7	76.7	66.2- 86.4	Accept.
239-ZINC	002	380.	402	359- 441	Accept.
<b>NITRATE/NITRITE/FLUORIDE IN MILLIGRAMS PER LITER:</b>					
009-NITRATE AS N	001	12.4	15.0	13.5- 16.5	Not Accept.
010-FLUORIDE	001	5.61	6.20	5.58- 6.82	Accept.
092-NITRITE AS N	001	1.80	1.70	1.45- 1.96	Accept.
261-ORTHOPHOSPHATE AS P	001	1.26	1.30	1.19- 1.39	Accept.
<b>INSECTICIDES IN MICROGRAMS PER LITER:</b>					
011-ENDRIN	001	0.784	0.789	0.552- 1.03	Accept.
012-LINDANE	001	2.69	2.50	1.38- 3.63	Accept.

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Participant ID:	PA00009	Type:	OTHER	Requesting Office:	NH
	Sample Number	Reported Value	True Value*	Acceptance Limits	Performance Evaluation
013-METHOXYCHLOR	001	26.4	26.8	14.7- 38.9	Accept.
014-TOXAPHENE	002	7.29	6.90	3.8- 10	Accept.
093-ALACHLOR	004	12.7	12.9	7.1- 18.7	Accept.
094-ATRAZINE	004	14.3	14.5	7.98- 21	Accept.
095-HEPTACHLOR	001	0.710	0.830	0.457- 1.2	Accept.
096-HEPTACHLOR EPOXIDE	001	0.620	0.630	0.347-0.914	Accept.
097-CHLORDANE (TOTAL)	003	2.57	2.90	1.6- 4.21	Accept.
112-HEXACHLOROCYCLOPENTADIENE	001	1.08	1.93	0.0861- 2.58	Accept.
113-SIMAZINE	004	13.1	11.8	3.29- 17.9	Accept.
172-HEXACHLOROBENZENE	001	1.00	1.03	0.426- 1.23	Accept.
258-DIELDRIN	001	0.928	0.920	0.622- 1.14	Accept.
259-PROPACHLOR	001	5.38	5.02	3.14- 6.8	Accept.
CARBAMATES IN MICROGRAMS PER LITER:					
098-ALDICARB	001	35.7	35.3	26.6- 45.1	Accept.
099-ALDICARB SULFONE	001	14.8	15.3	10.4- 17.5	Accept.
100-ALDICARB SULFOXIDE	001	23.0	26.0	16.6- 30	Accept.
101-CARBOFURAN	001	43.4	43.7	24- 63.4	Accept.
114-OXAMYL (VYDATE)	001	31.8	33.8	23.6- 40.8	Accept.
245-METHOMYL	001	217.	238	187- 270	Accept.
HERBICIDES IN MICROGRAMS PER LITER:					
015-2,4-D	001	49.7	73.1	36.6- 110	Accept.
016-2,4,5-TP (SILVEX)	001	21.9	24.1	12.1- 36.2	Accept.

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Participant ID: PA00009	Type: OTHER	Requesting Office: NH			
	Sample Number	Reported Value	True Value*	Acceptance Limits	Performance Evaluation
<b>102-PENTACHLOROPHENOL</b>					
115-DALAPON	001	24.9	34.6	17.3- 51.9	Accept.
116-DINOSEB	001	143.	183	D.L. - 258	Accept.
117-PICLORAM	001	13.9	27.6	0.568- 41.9	Accept.
247-DICAMBA	001	47.0	62.1	D.L. - 86.9	Accept.
262-ACIFLUORFEN	001	94.4	123	32.1- 167	Accept.
001	71.4	72.1	25.4- 101	Accept.	
<b>POLYCHLORINATED BIPHENYLS IN MICROGRAMS PER LITER:</b>					
118-DECACHLOROBIPHENYL	001	1.98	1.80	D.L. - 3.6	Accept.
<b>PAH'S IN MICROGRAMS PER LITER:</b>					
122-BENZO(A)PYRENE	001	1.28	2.37	0.502- 2.87	Accept.
<b>136-DI (2-ETHYLHEXYL)PHTHAL.</b>					
001	16.0	15.3	6.95- 24.7	Accept.	
<b>TRIHALOMETHANES IN MICROGRAMS PER LITER:</b>					
017-CHLOROFORM	001	13.2	14.4	11.5- 17.3	Accept.
018-BROMOFORM	001	14.5	16.6	13.3- 19.9	Accept.
019-BROMODICHLOROMETHANE	001	10.7	12.3	9.84- 14.8	Accept.
020-CHLORODIBROMOMETHANE	001	16.3	19.4	15.5- 23.3	Accept.
021-TOTAL TRIHALOMETHANE	001	54.7	62.7	50.2- 75.2	Accept.
<b>VOLATILE ORGANIC COMPOUNDS IN MICROGRAMS PER LITER:</b>					
032-VINYL CHLORIDE	001	24.1	22.3	13.4- 31.2	Accept.
034-1,1-DICHLOROETHYLENE	001	6.60	5.25	3.15- 7.35	Accept.
035-1,2-DICHLOROETHANE	001	15.4	13.7	11- 16.4	Accept.
036-1,1,1-TRICHLOROETHANE	001	13.7	12.6	10.1- 15.1	Accept.

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Participant ID: PA00009	Type: OTHER	Requesting Office: NH		
Sample Number	Reported Value	True Value*	Acceptance Limits	Performance Evaluation
<b>037-CARBON TETRACHLORIDE</b>				
001	15.7	14.2	11.4- 17	Accept.
<b>038-TRICHLOROETHYLENE</b>				
001	7.33	6.87	4.12- 9.62	Accept.
<b>039-BENZENE</b>				
001	19.6	18.7	15- 22.4	Accept.
<b>040-TETRACHLOROETHYLENE</b>				
001	10.5	11.5	9.2- 13.8	Accept.
<b>041-1,4-DICHLOROBENZENE</b>				
001	15.8	15.8	12.6- 19	Accept.
<b>044-1,2 DICHLOROPROPANE</b>				
001	15.8	15.4	12.3- 18.5	Accept.
<b>045-1,2DIBROMO3CHLOROPROPANE</b>				
003	0.301	0.451	0.271-0.631	Accept.
<b>046-ETHYLENE DIBROMIDE (EDB)</b>				
003	0.267	0.344	0.206-0.482	Accept.
<b>047-TOLUENE</b>				
001	19.9	18.7	15- 22.4	Accept.
<b>048-ETHYLBENZENE</b>				
001	15.1	14.7	11.8- 17.6	Accept.
<b>049-CHLOROBENZENE</b>				
001	19.3	18.6	14.9- 22.3	Accept.
<b>053-STYRENE</b>				
001	13.1	12.4	9.92- 14.9	Accept.
<b>054-1,2 DICHLOROBENZENE</b>				
001	12.7	11.3	9.04- 13.6	Accept.
<b>055-DICHLOROMETHANE</b>				
001	15.6	15.9	12.7- 19.1	Accept.
<b>060-2,2-DICHLOROPROPANE</b>				
002	13.2	12.7	9.73- 14.4	Accept.
<b>061-1,1,2-TRICHLOROETHANE</b>				
001	12.6	13.3	10.6- 16	Accept.
<b>063-1,1,1,2TETRACHLOROETHANE</b>				
002	14.9	15.2	12- 17.5	Accept.
<b>064-1,2,3-TRICHLOROPROPANE</b>				
002	15.5	14.8	10.2- 18	Accept.
<b>076-1,2,4-TRICHLOROBENZENE</b>				
001	14.6	14.2	11.4- 17	Accept.
<b>077-1,2,3-TRICHLOROBENZENE</b>				
002	20.6	18.4	12.7- 21.5	Accept.
<b>081-HEXACHLOROBUTADIENE</b>				
002	13.5	11.6	8.53- 14.5	Accept.
<b>090-TOTAL XYLEMES</b>				
001	34.8	30.8	24.6- 37	Accept.

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Date: 30SEP98

Participant ID:	PA00009	Type:	OTHER	Requesting Office:	NH				
Sample Number	Reported Value	True Value*	Acceptance Limits	Performance Evaluation					
152-C 1,3 DICHLOROPROPENE	002	13.7	15.2	12.1-	17.4				
153-T 1,3 DICHLOROPROPENE	002	13.0	13.7	10-	15.6				
<b>MISCELLANEOUS ANALYTES:</b>									
022-RESIDUAL FREE CHLORINE(MILLIGRAMS PER LITER)	001	1.79	1.90	1.55-	2.32				
023-TURBIDITY(NTU'S)	001	2.89	2.60	2.37-	3.31				
024-TOTAL FILTERABLE RESIDUE(MILLIGRAMS PER LITER)	001	407.	474	287-	826				
025-CALCIUM HARDNESS(MG. CACO3/L)	001	261.	248	229-	266				
026-PH-UNITS	001	9.06	9.13	8.88-	9.28				
027-ALKALINITY(MG. CACO3/L)	001	51.6	50.6	48-	56.7				
029-SODIUM(MILLIGRAMS PER LITER)	001	23.7	23.3	21.6-	26.3				
263-TOC	001	1.70	1.60	1.21-	2.05				
264-LOW-LEVEL TURBIDITY(BY BENCH-TOP, PORTABLE, OR IR INSTR.)	002	Not Evaluated in this Study							
	003	Not Evaluated in this Study							
	004	Not Evaluated in this Study							
***** END OF DATA FOR PA00009 *****									
NOTE: FOR LIMITS AND TRUE VALUES, ASSUME THREE SIGNIFICANT DIGITS.									
***** END OF REPORT FOR PA00009 *****									

\* Based on gravimetric calculations, or a reference value when necessary.

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JAN 12

LANCASTER Lab OCL  
 THOMAS DOD TOWNE RD  
 2425 NEW HOLLAND PRICE  
 LANCASTER PA 17601

Report: FE005  
 Page: 1  
 Date: 19NOV98

Participant ID: PA000C9		Type: OTHER	Requesting Office: DT			
Sample Number	Reported Value <sup>a</sup>	True Value <sup>a</sup>	Acceptance Limits	Warning Limits	Performance Evaluation	
<b>TRACE METALS IN MICROGRAMS/LITER</b>						
001-ALUMINUM	01	3040.	3105	2740- 3440	2830- 3350	Accept.
002-ARSENIC	01	148.	160	128- 190	136- 183	Accept.
003-BERYLLIUM	02	36.9	36.9	23.1- 42.2	34.2- 41	Accept.
004-CADMIUM	01	162.	170	147- 193	152- 187	Accept.
008-IRON	01	647.	700	654- 751	670- 765	Accept.
009-MERCURY	01	790.	834	744- 936	760- 912	Accept.
010-MANGANESE	01	1.21	1.15	0.813- 1.47	0.895- 1.39	Accept.
011-NICKEL	01	230.	240	216- 259	222- 254	Accept.
012-LEAD	01	2450.	2501	2340- 2860	2400- 2790	Accept.
013-SELENIUM	01	68.4	70.6	61.7- 83.3	64.4- 80.6	Accept.
014-VANADIUM	01	231.	260	189- 297	202- 284	Accept.
015-ZINC	01	4240.	4202	3880- 4640	3980- 4550	Accept.
016-ANTIMONY	01	609.	631	563- 709	581- 690	Accept.
017-SILVER	02	500.	499	381- 590	407- 564	Accept.
018-THALLIUM	02	821.	851	736- 930	760- 908	Accept.
074-MOLYBDENUM	02	830.	841	747- 970	775- 942	Accept.
075-STRONTIUM	02	19.4	18.2	14- 22	15- 21	Accept.
076-TITANIUM	02	302.	301	263- 342	273- 332	Accept.
020-SPEC. CONC. (URBOS/CR AT 25 C)	01	490.	525	471- 544	480- 535	Accept.
<b>MINERALS IN MILLIGRAMS/LITER (EXCEPT AS NOTED)</b>						

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Performance Evaluation Report  
 USEPA Water Pollution Study WPO40

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Participant ID: PA00009	Type: OTHER	Requesting Office: UT			
Sample Number	Reported Value	True Value*	Acceptance Limits	Warning Limits	Performance Evaluation
021-TDS AT 180 C					
01	277.	274	230- 337	243- 323	Accept.
022-TOTAL HARDNESS(AS CACCO)					
01	99.2	105	93.3- 119	96.5- 116	Accept.
023-CALCIUM					
01	28.3	29.0	25.1- 31.2	26.1- 32.2	Accept.
024-MAGNESIUM					
01	7.50	8.00	7.06- 8.86	7.29- 8.64	Accept.
028-CHLORIDE					
01	74.3	74.9	68.1- 83.2	70- 81.3	Accept.
029-FLUORIDE					
01	0.626	0.860	0.718- 1.05	0.777- 1.01	Accept.
030-SULFATE					
01	67.8	69.0	58.3- 78.4	60.8- 75.9	Accept.
NUTRIENTS IN MILLIGRAMS/LITER					
031-AMMONIA-NITROGEN					
01	4.65	4.80	3.89- 5.24	4.13- 5.6	Accept.
032-NITRATE-NITROGEN					
01	11.6	12.0	10.1- 13.9	10.6- 13.4	Accept.
033-ORTHOPHOSPHATE					
01	0.578	0.580	0.476-0.669	0.516-0.646	Accept.
034-KJELDAHL-NITROGEN					
02	4.37	5.40	4.02- 6.79	4.35- 6.45	Accept.
035-TOTAL PHOSPHORUS					
02	3.49	4.00	1.3- 4.68	3.47- 4.52	Accept.
DEMANDS IN MILLICFAMS/LITER					
036-COD					
01	64.0	60.7	42.5- 73.5	46.5- 69.5	Accept.
037-TOC					
01	24.8	24.0	20.7- 28.1	21.6- 27.2	Accept.
038-5-DAY BOD					
01	42.2	37.6	17.7- 57.2	22.6- 52.2	Accept.
102-CARBONACEOUS BOD					
01	39.0	31.9	14.5- 53.4	19.6- 48.3	Accept.
PCB'S IN MICROGRAMS/LITER					
042-PCB-AKOCOLOR 1232					
01	3.53	4.73	1.1- 7.18	1.88- 6.41	Accept.
046-PCB-AKOCOLOR 1260					
02	2.52	3.24	1.29- 4.6	1.71- 4.18	Accept.

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Performance Evaluation Report USEPA Water Pollution Study WPO40						Report: FE005 Page: 3 Date: 198CV9E
Participant ID: PA00CC9		Type: CTEER		Requesting Office: UT		
Sample Number	Reported Value	True Value <sup>a</sup>	Acceptance Limits	Barding Limits	Performance Evaluations	
<b>PCB'S IN CIL IN MILLIGRAMS/KILOGRAM</b>						
099-PCB IN OIL- 1016/1242	02	34.7	38.7	3.96- 57.2	10.8- 50.3	Accept.
100-PCB IN OIL- 1254	01	22.2	24.0	D.L. - 40.2	3.97- 34.9	Accept.
<b>PESTICIDES IN MICROGRAMS/LITER</b>						
050-DDB	01	3.20	3.64	1.74- 5.1	2.16- 4.68	Accept.
051-DDT	01	6.79	8.42	2.61- 12.7	3.69- 11.5	Accept.
052-HEPTACHLOR	01	1.60	2.49	0.837- 3.41	1.16- 3.08	Accept.
053-CHLORDANE	02	3.11	4.81	2.08- 6.8	2.68- 6.2	Accept.
078-HEPTACHLOR EPOXIDE	01	1.37	1.98	1.13- 2.42	1.29- 2.26	Accept.
<b>VOLATILE HALOCARBONS IN MICROGRAMS/LITER</b>						
054-1,2 DICHLOROETHANE	01	15.8	14.6	9.85- 18.5	10.9- 17.0	Accept.
055-CHLOROFORP	01	19.0	18.4	13.7- 21.7	14.7- 20.7	Accept.
056-1,1,1 TRICHLOROETHANE	01	33.8	32.8	22.2- 41.1	24.6- 38.7	Accept.
057-TRICHLOROETHENE	01	23.2	23.4	15.6- 29.8	17.4- 28	Accept.
058-CARBON Tetrachloroethane	01	22.0	26.3	16.3- 32.9	18.3- 30.8	Accept.
059-TETRACHLOROETHENE	01	32.3	32.5	21.6- 39.5	23.8- 37.2	Accept.
060-BROMODICHLOROMETHANE	01	17.7	16.5	10.9- 19.8	12- 18.7	Accept.
061-DIBROMOCHLOROMETHANE	01	30.9	32.7	21.4- 40.6	23.8- 38.2	Accept.
062-BROMOFORM	01	14.6	14.7	8.12- 18.7	9.44- 17.3	Accept.
063-METHYLENE CHLORIDE	01	45.4	44.1	29.7- 58.8	33.3- 55.1	Accept.
064-CHLOROBENZENE	01	24.6	24.7	17.6- 29.3	19- 27.8	Accept.

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Performance Evaluation Report  
USEPA Water Pollution Study WP040

Participant ID: PA00009	Type: OTHER	Requesting Office: GT			
Sample Number	Reported Value	True Value*	Acceptance limits	Warning Limits	Performance Evaluation
-----					
VOLATILE AROMATICS IN MICROGRAFS/LITTER					
065-BENZENE	01	29.1	25.7	21.9- 33.7	23.4- 32.2
066-ETHYLBENZENE	01	42.3	42.6	29.9- 54	32.9- 50.5
067-TOLUENE	01	33.5	32.3	23.9- 39.8	25.9- 37.8
*****					

MISCELLANEOUS ANALYTES

019-PH-UNITS	01	8.54	8.60	8.31- 8.52	8.38- 8.84	Accept.
071-TOTAL CYANIDE (IN MG/L)	01	0.122	0.140	0.089-0.164	0.101-0.172	Accept.
072-NON-FILTERABLE RESIDUE (IN MG/L)	01	54.2	60.0	32.4- 80.7	20.9- 72.1	Accept.
073-OIL AND GREASE (P-XC6W EXTRACTION) (IN MG/L)	01	14.3	19.1	5.9- 27.5	8.78- 24.6	Accept.
097-TOTAL PHENOLICS (IN MG/L)	01	.0405	0.0668	0.0261-0.108	0.0367-0.097	Accept.
098-TOTAL RESIDUAL CHLORINE (IN MG/L)	01	1.06	0.930	0.811- 1.32	0.878- 1.25	Accept.
104-OIL AND GREASE (HEXANE EXTRACTION) (IN MG/L)	01	18.1	19.1	5.65- 28.7	8.82- 25.6	Accept.

\*\*\*\*\* END OF DATA FOR PA00009 \*\*\*\*\*  
NOTE: FOR LIMITS AND TRUE VALUES, ASSUME THREE SIGNIFICANT DIGITS.  
\*\*\*\*\* END OF REPORT FOR PA00009 \*\*\*\*\*

\* Based on gravimetric calculations, or a reference value when necessary.

### **13. Preventive Maintenance**

In order to ensure timely production of data, Lancaster Laboratories schedules routine preventive maintenance of instruments based on manufacturer's recommendations. Maintenance of the laboratory instruments is the responsibility of the technical group using the equipment in conjunction with our in-house Equipment Maintenance Group. A schedule of routinely performed instrument maintenance tasks is attached as Table 13-1. All preventive maintenance, as well as maintenance performed as corrective action, is recorded in instrument logs.

Critical spare parts are kept in supply at the laboratory by the Equipment Maintenance Group. Most items not kept in stock at the laboratory are available through overnight delivery from the manufacturer. In addition, Lancaster Labs maintains multiple numbers of most of the critical instruments used in our laboratory operations. A recent equipment inventory may be found in the *Qualification Manual*. Because we are a large laboratory with redundant capacity, the problems of instrument downtime are minimized.

Section No. 13  
 Revision No. 4  
 Date: 04/27/98  
 Page 2 of 3

**Table 13-1**

<b>Preventive Maintenance Schedule</b>		
<b>Instrument</b>	<b>Preventive Maintenance</b>	<b>Frequency</b>
GC/MS	Change septum Check fans Check cool flow Clean source Change oil in vacuum pump Change oil in turbo pump	Weekly or AN* Monthly Monthly Bimonthly or AN Semiannually Semiannually
GC Volatiles	Check propanol level Check all flows Conductivity detector maintenance: Clean cell Change reaction tube Change Teflon line Change resin Replace trap Column maintenance Change PID lamp Precalibration instrument settings check	Semiweekly or AN Prior to calib. or AN AN AN AN AN AN AN AN AN AN Prior to each calibration
GC	Septum change Column maintenance Clean detector Vacuum filters Leak check ECDs	Each run AN AN Semiannually Semiannually
Flame AA and Hydride Generation AA	Rinse burner head, chamber and trap Clean nebulizer Inspect tubing and O-rings Replace lamp	AN: Min. Weekly Weekly Monthly AN
GFAA	Rinse workhead assembly Clean windows Replace probe tubing Check rinse bottle & drain	Weekly Weekly AN Daily
Cold Vapor AA	Change drying tube Replace pump tubing Lubricate pump head Lubricate autosampler Inspect optical cell and windows Clean	Daily AN: Min. weekly Weekly Weekly Monthly AN
ICP	Clean torch Clean nebulizer & spray chamber Replace pump winding Lubricate autosampler Check mirror Checking tubing to torch Check fan filters, clean if needed Check cool flow, clean if needed Check water filter, replace if needed	AN AN Check Daily Check Daily Daily Daily Weekly Weekly Quarterly

**Table 13-1**

<b>Preventive Maintenance Schedule</b>		
<b>Instrument</b>	<b>Preventive Maintenance</b>	<b>Frequency</b>
Autoanalyzer	Clean sample probe Clean proportioning pump Inspect pump tubing, replace if worn Clean wash receptacles Inspect condition of distillation head	AN Weekly AN Monthly Monthly
Infrared Spectrometer (FTIR)	Check on-demand diagnostics Check wavenumber with polystyrene film Change dessicant	Quarterly Quarterly Quarterly
HPLC	Pump lubrication Check pump seals Check valves cleaned or rebuilt Detector maintenance: Bulb replacement and adjustment Flow cell cleaning Routine column maintenance Replace Teflon lines Autosampler septa replacement In-line filter sonication/cleaning System pasivation PCRS pump lubrication	Annually Annually AN AN  AN AN AN AN AN AN AN
Total Organic Carbon Analyzer	Check IR zero Check for leaks Check acid pump calib. Check persulfate pump calibration Inspect 6-port rotary valve Inspect sample pump head Wash molecular sieve Check sample loop calibration Clean gas permeation tube Inspect digestion vessel O-rings Check activated carbon scrubber Dust back and clean circuit boards Check IR cell	AN AN Bimonthly Bimonthly AN AN AN Monthly AN AN AN AN AN AN
Total Organic Halogen Analyzer	Polish counter electrode Polish sensor electrode Clean loaders and pistons Replace agar bridge	Daily Biweekly Biweekly Monthly

\* AN means as needed. Any of these items may be performed more frequently if response during operation indicates this is necessary.

**14. Specific Routine Procedures Used to Assess Data Precision, Accuracy, and Completeness**

Precision - Precision refers to the reproducibility of a method when it is repeated on a second aliquot of the same sample. The degree of agreement is expressed as the relative percent difference (RPD). The RPD will be calculated according to the following equation:

$$RPD = \frac{|D_2 - D_1|}{(D_1 + D_2) / 2} \times 100$$

Where:

$D_1$  = First sample value

$D_2$  = Second sample value (Duplicate)

Duplicates will be run on at least 5% of the samples. Acceptance criteria shall be based on statistical evaluation of past lab data. (See Section No. 11.) All quality control sample results are entered into the computer and compared with acceptance limits. In addition, there is a monthly review of values on the computer QC system. Data obtained from quality control samples is entered onto our computer system which charts the data and calculates a mean and standard deviation on a monthly basis. The Quality Assurance Department then reviews this data for trends which may indicate analytical problems. The control charts are graphical methods for monitoring precision and bias over time.

Accuracy - Accuracy refers to the agreement between the amount of a compound measured by the test method and the amount actually present. Accuracy is usually expressed as a percent recovery (R). Recoveries will be calculated according to the following equations:

$$\text{Surrogate Recovery} = \frac{Qd}{Qa} \times 100$$

Where:

Qd = Quantity determined by analysis

Qa = Quantity added to sample

$$\text{Matrix Spike Recovery} = \frac{\text{SSR} - \text{SR}}{\text{SA}} \times 100$$

Where:

SSR = Spiked sample results

SR = Sample results

SA = Spike added

$$\text{Laboratory Control Sample Recovery} = \frac{\text{LCS Found}}{\text{LCS True}} \times 100$$

Surrogate standards are added to each sample analyzed for organics. Spikes and laboratory control samples will be run on at least 5% of the samples (each batch or SDG,  $\leq 20$  samples). Refer to Section 11 for acceptance criteria for accuracy. The computer is programmed to compare the individual values with the acceptance limits and inform the analyst if the results meet specification. If the results are not within the acceptance criteria, corrective action suitable to the situation will be taken. This may include, but is not limited to, checking calculations and instrument performance, reanalysis of the associated samples, examining other QC analyzed with the same batch of samples, and qualifying results with documentation of any QC problems in the case narrative.

Commercial quality control materials are run at least quarterly to ensure accuracy of the analytical procedure. Repetitive analysis of a reference material will also yield precision data. Accuracy information determined from reference materials is valuable because variables specific to sample matrix are eliminated.

The QC program is capable of charting data for surrogates, spikes, control materials, and reference materials. The Quality Assurance Department reviews these charts for any indication of possible problems (i.e., shift in the mean and standard deviation).

Completeness - Completeness is the percentage of valid data acquired from a measurement system compared to the amount of valid measurements that were planned to be collected. The objective is analysis of all samples submitted intact, and to ensure that sufficient sample weight/volume is available should the initial analysis not meet acceptance criteria. The laboratory's sample management system will assign a unique identification number to the sample which tracks and controls movement of samples from the time of receipt until disposal. All data generated will be recorded referencing the corresponding sample identification number. The completeness of an analysis can be documented by including in the data deliverables sufficient information to allow the data user to assess the quality of the results. This information will include, but is not limited to, summaries of QC data and sample results, chromatograms, spectra, and instrument tune and calibration data. Additional information will be stored in the laboratory's archives, both hard copy and magnetic tape.

$$\text{Completeness} = \frac{\text{Number of valid measurements}}{\text{Total measurements needed}} \times 100$$

Method Detection Limit - It is important to ascertain the limit of quantitation that can be achieved by a given method, particularly when the method is commonly used to determine trace levels of analyte. The Environmental Protection Agency has set forth one method for determining method detection limits (MDLs) from which limits of quantitation (LOQs) can be extrapolated.

MDL is defined as follows for all measurements:

Where:

$$MDL = t_{(n - 1, 1 - \alpha = 0.99)} \times s$$

MDL = Method detection limit

s = Standard deviation of the replicate analyses

$t_{(n-1, 1-\alpha = 0.99)}$  = Students' t-value for a one-sided 99% confidence level and a standard deviation estimate with n-1 degrees of freedom

Definitions:

Method detection limit (MDL) - The method detection limit is defined as the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero. It is determined from analysis of a sample in a given matrix containing the analyte.

Limit of quantitation (LOQ) - The limit of quantitation is defined as the level above which quantitative results may be obtained with a specified degree of confidence. The EPA recommends setting quantitation limits at a value of 5 $\times$  to 10 $\times$  the MDL.

A list of MDLs and LOQs determined for each sample matrix type will be kept on file in the QA department. MDLs will be verified on an annual basis.

## **15. Corrective Action**

Whenever any of the data generated falls outside of the established acceptance criteria outlined for instrument tune and calibration (Section 8) and internal QC (Section 11), the cause of this irregularity must be investigated, corrected, and documented. The documentation will be used to prevent a recurrence of the problem and to inform management of the situation.

If the results are not within acceptance criteria, the appropriate corrective action will be initiated. This may include, but is not limited to, checking calculation and instrument performance, reanalysis of the associated samples, examining other QC analyzed with the same batch of samples, and qualifying results with a comment stating the observed deviation.

A standard operating procedure is in place which outlines the procedures to be followed when quality control data for an analysis falls outside of previously established acceptance limits. All QC data must be entered onto the computerized QC system promptly after its generation and daily "out-of-spec" data is reported via this system. Any data outside the acceptance criteria will be reviewed by the Quality Assurance Department. Where appropriate, the Quality Assurance Department will place outliers in one of three categories:

- A. Marginal Outlier - Data that are outside the 95% confidence interval but within the 99% confidence interval. This category may also be used for QC samples subject to matrix interferences or sample inhomogeneity.
- B. Outlier - Data outside the 99% confidence interval and/or observable trends such as a shift in mean and standard deviation.
- C. Extreme Outlier - Such data would indicate the system is out of control and no results should be reported to clients; an example would be more than one reference or control falling outside the 99% confidence interval.

The daily out-of-spec reports are then distributed to group leaders or their QC coordinator who will check all supporting data and document their findings and any corrective action taken. Documentation of QC data will be filed in the

departmental QC notebook. In the case of outliers or extreme outliers, the Quality Assurance Department may issue a formal request for investigation and corrective action (see sample form that follows). The Quality Assurance Department is responsible for initiating the corrective actions, insuring that the actions are taken in a timely manner, and that the desired results are produced. The QA Department will circulate all completed Investigation and Corrective Action forms to the appropriate manager.

The Quality Assurance Department is also responsible for conducting periodic audits which ensure compliance with laboratory SOPs and assist in identifying and correcting any deficiencies. These audits may entail observation as procedures are carried out or a review of records to demonstrate traceability and compliance with all documented record keeping procedures. The QA Department will then issue a written report which summarizes the audit. The technical centers must respond in writing to the audit report within 30 days of report receipt. The response will address the corrective action that needs to be taken along with an expected completion date. Audit results and the corresponding response are communicated to laboratory personnel and management. Follow-up audits verify that proper corrective action has been taken for the identified discrepancy.

Figure 15-1A



2425 New Holland Pike • Lancaster, PA 17601-5994

No. \_\_\_\_\_

**Investigation and Corrective Action Report (ICAR)**

Part I - Description of the Problem (Attach additional page, if needed, in addition to supporting documentation.)

1. Date of issue:
2. LL sample number(s) involved:
3. Nature of the problem (describe in detail):

Initiated by: \_\_\_\_\_

Part II - The Investigation (Attach additional page, if needed, in addition to supporting documentation.)

1. Steps taken to investigate the problem:

2. Explanation of probable cause(s):

3. Steps taken to prevent future occurrence:

4. Must investigation be complete before reporting further data to clients? Yes No

5. In addition to the samples listed above, would any additional data already reported to clients be affected by this problem? Yes No If yes, please explain

Investigator(s): \_\_\_\_\_ Date: \_\_\_\_\_

Investigator(s): \_\_\_\_\_ Date: \_\_\_\_\_

Supervisor(s): \_\_\_\_\_ Date: \_\_\_\_\_

Supervisor(s): \_\_\_\_\_ Date: \_\_\_\_\_

Quality Assurance: \_\_\_\_\_ Date: \_\_\_\_\_

Return to QA by: \_\_\_\_\_

## **16. Quality Assurance Reports to Management**

Reports of quality status from the Quality Assurance Department to management are made frequently and in various forms. All results from internal or external performance evaluation samples are circulated to management. A report of each audit performed is prepared and copied to management. Monthly summaries of data obtained from analysis of quality control check samples are generated via the computerized sample management system. These summaries include mean and standard deviation to aid in assessment of data accuracy and precision. Forms summarizing problems which require investigation and corrective action are completed by group leaders and circulated to management. Through these channels, laboratory management is kept apprised of QA/QC activities.

Any problems or unusual observations that occur during the analysis of samples for a specific project will be listed on the laboratory report and/or in the case narrative delivered with the data package. The items often discussed in this manner include samples with surrogate recovery outside of the acceptance criteria and samples with matrix problems requiring dilution and causing increased detection limits. Where applicable, any corrective action attempted or performed to address the problem will also be presented.

The laboratory will contact the client for direction regarding major problems such as samples listed on the chain of custody but missing from the shipping container, samples which arrive broken or are accidentally broken in the laboratory, and samples with severe matrix problems. The client will be contacted if it is necessary to change any item in the original project plan.

**Appendix A**  
**Example Reporting Forms**

## **Data Package Content**

Title Page

Sample Reference

Table of Contents

Chain of Custody

Laboratory Chronicle

Methodology/Reference Summary

Laboratory Analysis Reports

Per Parameter:

    Case Narrative

    Quality Control Summary

        Tune<sup>1</sup>

        Surrogate Recovery

        Method Blank

        Matrix Spike/Matrix Spike Duplicate

        Duplicate<sup>2</sup>

        Standard Addition<sup>2</sup>

        Serial Dilution<sup>2</sup>

        Laboratory Control Sample Recovery (if applicable)

        Interference Check<sup>2</sup>

        Internal Standard<sup>1</sup>

Sample Data

    Sample Result Summary and LOQs

    Sample Chromatograms

    Quantitation Reports

    Mass Spectra<sup>1</sup>

    Library Searches<sup>1</sup> (if applicable)

    Confirmatory Chromatogram<sup>3</sup>

    Confirmatory Quantitation Report<sup>3</sup>

Standards Data

    Initial Calibration Summary Forms

    Initial Calibration Data

    Continuing Calibration Summary Forms

    Continuing Calibration Data

    Chromatograms and Quantitation Reports of Standards

    Calibration Data for Confirmation Columns<sup>3</sup>

    Calibration Curve (When quantitating against init. calib.)

    ICAP Interference Table<sup>2</sup>

**Raw QC Data**

BFB/DFTPP Spectra and Mass Listing<sup>1</sup>  
Method Blank Chromatograms, Quantitation Reports,  
Mass Spectra<sup>1</sup> (GC/MS)  
Matrix Spike/Matrix Spike Duplicate Chromatograms and Quant.  
Duplicate Data Printouts<sup>2</sup>  
Standard Addition Data<sup>2</sup>  
Serial Dilution Data<sup>2</sup>  
Laboratory Control Sample (if applicable)  
Copy of Instrument Run Log  
Extraction/Digestion Logs  
Gel Permeation Chromatography (GPC), if applicable  
All Peaks Identified  
% Resolution Calculations

<sup>1</sup> GC/MS only

<sup>2</sup> Inorganics only

<sup>3</sup> GC only (if applicable)

\*Amount of documentation is dependent upon client request.



Page: 1 of 1

LLI Sample No. WW 2869067

Collected:

Submitted: 2/4/98 Reported: 3/26/98  
Discard: 4/10/98

Account No: 00649  
 Lancaster Laboratories  
 2425 New Holland Pike  
 Lancaster PA 17601-5994

P.O.  
Ref.

Trace Metals - 1

EPA WP039 Proficiency Samples

## AS RECEIVED

CAT NO.	ANALYSIS NAME	RESULTS	LIMIT OF QUANTITATION	UNITS
1743	Aluminum	0.47	0.20	mg/l
1749	Cadmium	0.034	0.010	mg/l
1751	Chromium	0.214	0.030	mg/l
1752	Cobalt	0.083	0.050	mg/l
1753	Copper	0.075	0.025	mg/l
1754	Iron	0.19	0.10	mg/l
1755	Lead	1.90	0.10	mg/l
1753	Manganese	0.527	0.010	mg/l
1761	Nickel	0.734	0.050	mg/l
1771	Vanadium	1.43	0.020	mg/l
1772	Zinc	0.126	0.025	mg/l
7035	Arsenic TR	0.888	0.010	mg/l
7035	Selenium TR	0.768	0.010	mg/l
0243	Aluminum	0.52	0.20	mg/l
0249	Cadmium	0.026	0.010	mg/l
0251	Chromium	0.213	0.030	mg/l
0253	Copper	0.061	0.025	mg/l
0254	Iron	0.21	0.10	mg/l
0255	Lead	1.79	0.10	mg/l
0253	Manganese	0.496	0.010	mg/l
0259	Mercury	0.00058	0.00020	mg/l
0261	Nickel	0.645	0.050	mg/l
0272	Zinc	0.138	0.025	mg/l
1045	Arsenic (furnace method)	0.79	0.20	mg/l
1061	Selenium (furnace method)	0.64	0.25	mg/l

1 COPY TO Lancaster Laboratories, Inc. ATTN: Ms. Sue Shorter

Questions? Contact your Client Services Representative  
 Kay G. Hower at (717) 656-2300  
 19:28:31 D 0001 20 601254  
 609 15.00 00041600 ASR000

Respectfully Submitted  
 Ramona V. Layman  
 Manager, Metals/Data Deliv.



ANALYTICAL CHEMISTRY  
 INSTRUMENTATION  
 AND RELATED TOPICS



Page: 1 of 1

**LLI Sample No. WW 2869072**

Collected:

Submitted: 2/4/98 Reported: 3/26/98  
Discard: 4/10/98

Demand - 1

EPA WP039 Proficiency Samples

Account No: 00649  
 Lancaster Laboratories  
 2425 New Holland Pike  
 Lancaster PA 17601-5994

P.O.  
Ref.

CAT NO.	ANALYSIS NAME	AS RECEIVED		UNITS
		RESULTS	LIMIT OF QUANTITATION	
0273	Total Organic Carbon	74.2	1.0	mg/l
	The Total Organic Carbon (TOC) result reported above was determined by measuring total carbon by a persulfate digestion/infrared detection method on an acidified sample which has been purged of inorganic carbon using nitrogen. It represents "non-purgeable TOC".			
0235	Biochemical Oxygen Demand	126.	2.0	mg/l
1364	Carbonaceous BOD	128.	2.0	mg/l
4001	Chemical Oxygen Demand	198.	50.	mg/l

1 COPY TO Lancaster Laboratories, Inc. ATTN: Ms. Sue Shorter

Questions? Contact your Client Services Representative  
 Kay G. Hower at (717) 656-2300  
 19:31:04 D 0001 20 601254  
 609 0.00 00012600 ASR000

Respectfully Submitted  
 Ramona V. Layman  
 Manager, Metals/Data Deliv.



Lancaster Laboratories  
2425 New Holland Pike  
Lancaster PA 17601-5994  
Phone: 717-656-2300  
Fax: 717-656-2301



LLI Sample No. WW 2869077

Collected:

Submitted: 2/4/98 Reported: 3/26/98  
Discard: 4/10/98

Account No: 00649  
 Lancaster Laboratories  
 2425 New Holland Pike  
 Lancaster PA 17601-5994

P.O.  
Ref.

Pesticides - 1

EPA WP039 Proficiency Samples

## AS RECEIVED

CAT NO.	ANALYSIS NAME	RESULTS	LIMIT OF QUANTITATION	UNITS
---------	---------------	---------	-----------------------	-------

## Pesticides/PCB's in Water

1902	Alpha BHC	< 0.010	0.010	ug/l
1903	Beta BHC	< 0.010	0.010	ug/l
0453	Gamma BHC - Lindane	< 0.010	0.010	ug/l
1904	Delta BHC	< 0.010	0.010	ug/l
0454	Heptachlor	0.61	0.10	ug/l
0455	Aldrin	0.97	0.10	ug/l
1905	Heptachlor Epoxide	0.50	0.10	ug/l
1906	DDE	1.53	0.10	ug/l
1907	DDD	2.01	0.10	ug/l
0478	DDT	2.51	0.10	ug/l
0469	Dieldrin	1.66	0.10	ug/l
0477	Endrin	< 0.010	0.010	ug/l
1908	Chlordane	< 0.30	0.30	ug/l
1909	Toxaphene	< 4.0	4.0	ug/l
1910	Endosulfan I	< 0.010	0.010	ug/l
1911	Endosulfan II	< 0.010	0.010	ug/l
1912	Endosulfan Sulfate	< 0.030	0.030	ug/l
0638	Endrin Aldehyde	< 0.10	0.10	ug/l
1913	PCB-1016	< 1.0	1.0	ug/l
1914	PCB-1221	< 1.0	1.0	ug/l
1915	PCB-1232	< 1.0	1.0	ug/l
1916	PCB-1242	< 1.0	1.0	ug/l
1917	PCB-1248	< 1.0	1.0	ug/l
1918	PCB-1254	< 1.0	1.0	ug/l
1919	PCB-1260	< 1.0	1.0	ug/l

Questions? Contact your Client Services Representative  
 Kay G. Hower at (717) 656-2300

Respectfully Submitted  
 Jenifer E. Hess, B.S.  
 Group Leader Pesticides/PCBs



Lancaster Laboratories  
 2425 New Holland Pike  
 Lancaster PA 17601-5994  
 (717) 656-2300

Where quality is a science.

2A

Lab Name: LANCASTER LABS

SDG No: MOY01

	EPA SAMPLE NO.	S1 (DBFM) #	S2 (DCA) #	S3 (TOL) #	S4 (BFB) #	OTHER	TOTAL OUT
01	MLCHR	106	98	100	101		
02	MLCHRMS	112	104	104	105		
03	MLCHRMSD	108	102	100	100		
04	MLTBN	108	102	101	103		
05							
06	LAB QC						
07	VBLKJ13	100	102	98	92		
08	VBLKJ17	106	98	100	100		
09	LCSJ13	99	104	98	94		
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							

QC LIMITS			
S1	(DBFM)	=	Dibromofluoromethane
S2	(DCA)	=	1,2-Dichloroethane-d4
S3	(TOL)	=	Toluene-d8
S4	(BFB)	=	4-Bromofluorobenzene

# Column to be used to flag recovery values

\* Values outside of contract required QC limits

D Surrogates diluted out

1/87 Rev.  
Modified

SA  
VOLATILE ORGANIC GC/MS TUNING AND MASS  
CALIBRATION - BROMOFLUOROBENZENE (BFB)

Lab Name: LANCASTER LABS

Contract: \_\_\_\_\_.

Lab Code: LANCAS Case No.: \_\_\_\_\_. SAS No.: \_\_\_\_\_. SDG No.: \_\_\_\_\_.

Lab File ID: >JAMT7

BFB Injection Date: 04/22/98

Instrument ID: HP03047

BFB Injection Time: 18:39

Matrix: (soil/water) WATER Level: (low/med) LOW Column: (pack/cap) CAP

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	15.0 - 40.0% of mass 95	16.6
75	30.0 - 60.0% of mass 95	44.0
95	Base peak, 100% relative abundance	100.
96	5.0 - 9.0% of mass 95	7.1
173	Less than 2.0% of mass 174	0.0 ( 0.0) 1
174	Greater than 50.0% of mass 95	50.2
175	5.0 - 9.0% of mass 174	3.6 ( 7.2) 1
176	Greater than 95.0%, but less than 101.0% of mass 174	48.0 ( 95.7) 1
177	5.0 - 9.0% of mass 176	3.3 ( 7.0) 2

1-Value is % mass 174

2-Value is % mass 176

HIS TUNE APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01 VSTD050	050 PPB IC	>JAMID	04/22/98	20:48
02 VSTD100	100 PPB IC	>JAMIE	04/22/98	21:24
03 VSTD300	300 PPB IC	>JAMIF	04/22/98	21:59
04 VSTD004	004 PPB IC	>JAMIG	04/23/98	01:02
05 VSTD010	010 PPB IC	>JAMIH	04/23/98	02:13
06 VSTD020	020 PPB IC	>JAMII	04/23/98	03:08
07				
08				
09				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				

1A  
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLKI05

Lab Name: LANCASTER LABS

Contract: \_\_\_\_\_

Lab Code: LANCAS Case No.: \_\_\_\_\_. SAS No.: \_\_\_\_\_. SDG No.: \_\_\_\_\_.

Matrix: (soil/water) SOIL

Lab Sample ID: VBLKI05

Sample wt/vol: 10.0 (g/mL) G

Lab File ID: >IAQB1

Level: (low/med) MED

Date Received: \_\_\_\_\_

% Moisture: not dec. \_\_\_\_\_

Date Analyzed: 04/26/98

Column: (pack/cap) CAP

Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg)	MDL	UG/KG	Q
75-71-8-----	Dichlorodifluoromethane	250		U	
74-87-3-----	Chloromethane	250		U	
75-01-4-----	Vinyl Chloride	250		U	
74-83-9-----	Bromomethane	380		U	
75-00-3-----	Chloroethane	380		U	
75-69-4-----	Trichlorofluoromethane	250		U	
107-02-8-----	Acrolein	2500		U	
75-35-4-----	1,1-Dichloroethene	250		U	
76-13-1-----	Freon 113	250		U	
67-64-1-----	Acetone	880		U	
75-15-0-----	Carbon Disulfide	380		U	
75-09-2-----	Methylene Chloride	250		U	
107-13-1-----	Acrylonitrile	1200		U	
156-60-5-----	trans-1,2-Dichloroethene	250		U	
75-65-0-----	t-Butyl Alcohol	2500		U	
1634-04-4-----	Methyl t-Butyl Ether	120		U	
75-34-3-----	1,1-Dichloroethane	120		U	
594-20-7-----	2,2-Dichloropropane	120		U	
156-59-2-----	cis-1,2-Dichloroethene	250		U	
78-93-3-----	2-Butanone	880		U	
74-97-5-----	Bromochloromethane	120		U	
67-66-3-----	Chloroform	120		U	
71-55-6-----	1,1,1-Trichloroethane	120		U	
56-23-5-----	Carbon Tetrachloride	120		U	
563-58-6-----	1,1-Dichloropropene	120		U	
71-43-2-----	Benzene	120		U	
107-06-2-----	1,2-Dichloroethane	250		U	
79-01-6-----	Trichloroethene	120		U	
78-87-5-----	1,2-Dichloropropane	380		U	
74-95-3-----	Dibromomethane	120		U	
75-27-4-----	Bromodichloromethane	250		U	
110-75-8-----	2-Chloroethyl Vinyl Ether	250		U	
10061-01-5-----	cis-1,3-Dichloropropene	120		U	
108-10-1-----	4-Methyl-2-Pentanone	380		U	
108-88-3-----	Toluene	120		U	

1A  
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLKI05

Lab Name: LANCASTER LABS

Contract: \_\_\_\_\_

Lab Code: LANCAS

Case No.: \_\_\_\_\_. SAS No.: \_\_\_\_\_. SDG No.: \_\_\_\_\_

Matrix: (soil/water) SOIL

Lab Sample ID: VBLKI05

Sample wt/vol: 10.0 (g/mL) G

Lab File ID: >IAQBI

Level: (low/med) MED

Date Received: \_\_\_\_\_

% Moisture: not dec. \_\_\_\_\_

Date Analyzed: 04/26/98

Column: (pack/cap) CAP

Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg)			Q
		MDL	UG/KG		

10061-02-6-----	trans-1,3-Dichloropropene	120	U
79-00-5-----	1,1,2-Trichloroethane	250	U
127-18-4-----	Tetrachloroethene	120	U
142-28-9-----	1,3-Dichloropropane	120	U
591-78-6-----	2-Hexanone	380	U
124-48-1-----	Dibromochloromethane	120	U
106-93-4-----	1,2-Dibromoethane	120	U
108-90-7-----	Chlorobenzene	120	U
630-20-6-----	1,1,1,2-Tetrachloroethane	250	U
100-41-4-----	Ethylbenzene	120	U
1330-20-7-----	m+p-Xylene	120	U
95-47-6-----	o-Xylene	120	U
100-42-5-----	Styrene	120	U
75-25-2-----	Bromoform	120	U
98-82-8-----	Isopropylbenzene	380	U
79-34-5-----	1,1,2,2-Tetrachloroethane	120	U
108-86-1-----	Bromobenzene	120	U
96-18-4-----	1,2,3-Trichloropropane	120	U
103-65-1-----	n-Propylbenzene	120	U
95-49-8-----	2-Chlorotoluene	120	U
108-67-8-----	1,3,5-Trimethylbenzene	120	U
106-43-4-----	4-Chlorotoluene	120	U
98-06-6-----	tert-Butylbenzene	120	U
95-63-6-----	1,2,4-Trimethylbenzene	120	U
135-98-8-----	sec-Butylbenzene	120	U
99-87-6-----	p-Isopropyltoluene	120	U
541-73-1-----	1,3-Dichlorobenzene	250	U
106-46-7-----	1,4-Dichlorobenzene	250	U
104-51-8-----	n-Butylbenzene	120	U
95-50-1-----	1,2-Dichlorobenzene	250	U
96-12-8-----	1,2-Dibromo-3-Chloropropane	250	U
120-82-1-----	1,2,4-Trichlorobenzene	120	U
87-68-3-----	Hexachlorobutadiene	250	U
91-20-3-----	Naphthalene	120	U
87-61-6-----	1,2,3-Trichlorobenzene	120	U

1E  
VOLATILE ORGANICS ANALYSIS DATA SHEET  
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO. \_\_\_\_\_

VBLKI05

Lab Name: LANCASTER LABS

Contract: \_\_\_\_\_

Lab Code: LANCAS Case No.: \_\_\_\_\_. SAS No.: \_\_\_\_\_. SDG No.: \_\_\_\_\_.

Matrix: (soil/water) SOIL

Lab Sample ID: VBLKI05

Sample wt/vol: 10.0 (g/mL) G

Lab File ID: >IAQB1

Level: (low/med) MED

Date Received: \_\_\_\_\_

% Moisture: not dec. \_\_\_\_\_

Date Analyzed: 04/26/98

Column: (pack/cap) CAP

Dilution Factor: 1.0

Number TICs found: 0

CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.				
2.				
3.				
4.				
5.				
6.				
7.				
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22.				
23.				
24.				
25.				

4A  
VOLATILE METHOD BLANK SUMMARY

Lab Name: LANCASTER LABS Contract: \_\_\_\_\_.  
Lab Code: LANCAS Case No.: \_\_\_\_\_. SAS No.: \_\_\_\_\_. SDG No.: \_\_\_\_\_.  
Lab File ID: >JAKB1 Lab Sample ID: VBLKJ13  
Date Analyzed: 04/20/98 Time Analyzed: 11:15  
Matrix: (soil/water) WATER Level: (low/med) LOW  
Instrument ID: HP03047

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
01 LCSJ13	LCSJ13	>JAK06	15:25
02 ESMW4DL	2907187	>JAK07	16:25
03 VP6--DL	2907190	>JAK08	17:03
04 VP6--	2907190	>JAK09	17:39
05 47EW2	2907307	>JAK10	18:38
06 47EW3	2907308	>JAK11	19:15
07			
08			
09			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			
25			
26			
27			
28			
29			
30			

COMMENTS: \_\_\_\_\_

8A  
VOLATILE INTERNAL STANDARD AREA SUMMARY

Lab Name: LANCASTER LABS

Contract: \_\_\_\_\_

Lab Code: LANCAS Case No.: \_\_\_\_\_ SAS No.: \_\_\_\_\_ SDG No.: \_\_\_\_\_

Lab File ID (Standard): >JAKS2

Date Analyzed: 04/20/98

Instrument ID: HP03047

Time Analyzed: 10:13

Matrix: (soil/water) WATER Level: (low/med) LOW Column: (pack/cap) CAP

	IS1(FBZ) AREA #	RT	IS2(CBZ) AREA #	RT	IS3(DCB) AREA #	RT
12 HOUR STD	115936	11.16	82736	15.44	42201	18.79
UPPER LIMIT	231872		165472		84402	
LOWER LIMIT	57968		41368		21101	
EPA SAMPLE NO.						
01 VBLKJ13	127105	11.16	92558	15.45	44749	18.79
02 LCSJ13	131383	11.18	94445	15.49	49279	18.84
03 ESMW4DL	138204	11.16	100360	15.44	49635	18.78
04 VP6--DL	129000	11.16	93165	15.45	44978	18.78
05 VP6--	125872	11.17	90957	15.44	44652	18.80
06 47EW2	137616	11.15	100123	15.44	50220	18.79
07 47EW3	132361	11.16	95398	15.45	47264	18.79
08						
09						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						

IS1 (FBZ) = Fluorobenzene

UPPER LIMIT = + 100%

IS2 (CBZ) = Chlorobenzene-d5

of internal standard area.

IS3 (DCB) = 1,4-Dichlorobenzene-d4

LOWER LIMIT = - 50%

of internal standard area.

# Column used to flag internal standard area values with an asterisk.

Lancaster Laboratories, Inc.  
GC/MS Volatiles Matrix Spike/Spike Duplicate Recoveries

Unspiked: ^JAN02  
MLCHR 2910334  
Method: 8260 5mL +SPECIALS  
Instrument: HP30347

Matrix spike: ^JAN04  
MLCHRMS 2910334  
Matrix/Level: WL  
Dilution Factor: 1.0

Spike Duplicate: ^JAN08  
MLCHRMDS 2910334  
Batch: J981101AD

COMPOUND NAME	SPIKE LEVEL	US CONC UG/L	MS CONC UG/L	MSD CONC UG/L	MS REC %	MSD REC %	RANGE LOWER-UPPER	IN SPEC	RPD %	RPD MAX
Dichlorodifluoromethane	20.00	0.00	17.02	17.60	85	83	44-150	YES	-3	30.00
Chloromethane	20.00	0.00	18.73	17.37	94	87	36-150	YES	8	30.00
Vinyl Chloride	20.00	0.00	20.44	19.96	102	100	55-141	YES	2	30.00
Bromomethane	20.00	0.00	19.83	19.54	99	98	17-149	YES	2	30.00
Chloroethane	20.00	0.00	17.25	17.31	86	85	28-140	YES	-0	30.00
Trichlorofluoromethane	20.00	0.00	21.75	11.97	109	60	42-151	NO	58	30.00
Acrolein	150.00	0.00	176.41	169.18	118	113	55-140	YES	4	30.00
1,1-Dichloroethene	20.00	0.00	23.76	22.17	119	111	48-141	YES	7	30.00
Acetone	150.00	0.00	142.63	132.53	95	83	59-119	YES	7	30.00
Carbon Disulfide	150.00	0.00	215.48	128.90	144	85	36-177	NO	50	30.00
Methylene Chloride	20.00	0.00	21.93	20.44	110	102	52-133	YES	7	30.00
Acrylonitrile	150.00	0.00	174.40	161.66	115	108	69-135	YES	6	30.00
trans-1,2-Dichloroethene	20.00	0.00	23.04	21.25	115	106	46-131	YES	8	30.00
t-Butyl Alcohol	200.00	0.00	246.05	232.52	123	115	30-200	YES	5	30.00
Methyl t-Butyl Ether	20.00	0.00	22.00	20.64	110	103	30-200	YES	6	30.00
1,1-Dichloroethane	20.00	0.00	23.24	21.43	115	107	66-125	YES	8	30.00
1,2-Dichloropropane	20.00	0.00	25.91	23.88	130	119	74-127	NO	8	30.00
cis-1,2-Dichloroethene	20.00	0.00	23.18	21.81	115	109	69-125	YES	6	30.00
2-Butanone	150.00	0.00	173.62	154.86	115	110	62-125	YES	5	30.00
Chloroform	20.00	0.00	21.94	20.60	110	103	79-121	YES	6	30.00
Bromochloromethane	20.00	0.00	21.12	20.62	106	103	72-119	YES	2	30.00
1,1,1-Trichloroethane	20.00	0.00	26.00	24.39	130	122	73-132	YES	6	30.00
Carbon Tetrachloride	20.00	0.00	23.25	21.36	115	107	69-134	YES	8	30.00
1,1-Dichloropropene	20.00	0.00	23.34	21.92	117	110	59-131	YES	6	30.00
Benzene	20.00	0.00	23.33	21.73	117	109	64-127	YES	7	30.00
1,2-Dichloroethane	20.00	0.00	22.36	21.31	112	106	72-124	YES	5	30.00
Trichloroethene	20.00	0.00	23.70	22.23	119	111	69-130	YES	6	30.00
1,2-Dichloropropane	20.00	0.00	22.26	20.70	111	103	71-123	YES	7	30.00
Dibromomethane	20.00	0.00	21.67	20.36	103	102	76-117	YES	6	30.00
Ethiodichloromethane	20.00	0.00	22.66	20.48	113	102	65-120	YES	10	30.00
2-Chloroethyl Vinyl Ether	20.00	0.00	7.12	3.95	36	20	30-200	NO	57	30.00
cis-1,3-Dichloropropene	20.00	0.00	22.57	20.93	113	105	71-118	YES	7	30.00
4-Methyl-2-Pentanone	100.00	0.00	122.29	116.96	122	117	64-135	YES	4	30.00
Toluene	20.00	0.00	23.15	21.82	116	109	56-150	YES	6	30.00
trans-1,3-Dichloropropene	20.00	0.00	21.95	20.35	110	102	70-119	YES	8	30.00

N/C = Could not calculate

Lab Chronicle: \_\_\_\_\_ Ent. by \_\_\_\_\_

Ver. by \_\_\_\_\_

\* The RPD for this compound exceeds requirements.

Lancaster Laboratories, Inc.  
GC/MS Volatiles Matrix Spike/Spike Duplicate Recoveries

Unspiked: ^JAN02  
MLCHR 2910334  
Method: 8260 5mL +SPECIALS  
Instrument: HP03047

Matrix spike: ^JAN04  
MLCHRMSS 2910334  
Matrix/Level: WL  
Dilution Factor: 1.0

Spike Duplicate: ^JAN08  
MLCHRMSSD 2910334  
Batch: J981101AD

COMPOUND NAME	SPIKE LEVEL	US CONC UG/L	MS CONC UG/L	MSD CONC UG/L	MS REC %	MSD REC %	RANGE LOWER-UPPER	IN SPEC	RPD %	RPD MAX
1,1,2-Trichloroethane	20.00	0.00	21.85	20.69	109	103	74-118	YES	5	30.00
Tetrachloroethene	20.00	0.00	25.21	23.12	126	116	61-148	YES	9	30.00
1,3-Dichloropropane	20.00	0.00	22.13	20.81	111	104	72-123	YES	6	30.00
2-Hexanone	100.00	0.00	123.48	121.10	123	121	60-136	YES	2	30.00
Dibromochloromethane	20.00	0.00	21.21	20.19	106	101	71-118	YES	5	30.00
1,2-Dibromoethane	20.00	0.00	22.27	21.04	111	105	72-116	YES	6	30.00
Chlorobenzene	20.00	0.00	23.72	22.10	119	110	74-120	YES	7	30.00
1,1,1,2-Tetrachloroethane	20.00	0.00	22.67	22.04	113	110	79-120	YES	3	30.00
Ethylbenzene	20.00	0.00	23.02	21.74	115	109	74-130	YES	6	30.00
m+p-Xylene	40.00	0.00	47.66	44.23	119	110	74-131	YES	7	30.00
o-Xylene	20.00	0.00	23.68	22.01	118	110	74-128	YES	7	30.00
Styrene	20.00	0.00	23.40	22.07	117	110	60-134	YES	6	30.00
Bromoform	20.00	0.00	23.85	21.91	118	110	72-115	NC	8	30.00
Isopropylbenzene	20.00	0.00	24.06	22.69	120	113	75-140	YES	6	30.00
1,1,2,2-Tetrachloroethane	20.00	0.00	21.35	20.53	107	103	65-123	YES	4	30.00
Bromobenzene	20.00	0.00	22.65	21.23	113	106	76-120	YES	6	30.00
1,2,3-Trichloropropane	20.00	0.00	21.95	20.31	110	102	70-121	YES	8	30.00
n-Propylbenzene	20.00	0.00	23.26	22.29	116	111	66-144	YES	4	30.00
2-Chlorotoluene	20.00	0.00	22.63	21.40	113	107	70-128	YES	6	30.00
1,3,5-Trimethylbenzene	20.00	0.00	24.05	23.05	120	115	71-132	YES	4	30.00
4-Chlorotoluene	20.00	0.00	22.98	21.74	115	109	67-130	YES	6	30.00
tert-Butylbenzene	20.00	0.00	24.61	23.53	123	118	72-134	YES	4	30.00
1,2,4-Trimethylbenzene	20.00	0.00	23.94	22.75	120	114	66-130	YES	5	30.00
sec-Butylbenzene	20.00	0.00	24.02	22.97	120	115	70-135	YES	4	30.00
p-Isopropyltoluene	20.00	0.00	23.20	22.25	116	111	76-139	YES	4	30.00
1,3-Dichlorobenzene	20.00	0.00	22.73	21.66	114	108	76-119	YES	5	30.00
1,4-Dichlorobenzene	20.00	0.00	22.74	21.76	114	109	75-119	YES	4	30.00
n-Butylbenzene	20.00	0.00	22.68	22.08	113	110	66-144	YES	3	30.00
1,2-Dichlorobenzene	20.00	0.00	23.24	22.05	116	110	73-121	YES	5	30.00
1,2-Dibromo-3-Chloropropane	20.00	0.00	21.80	20.26	109	101	46-127	YES	7	30.00
1,2,4-Trichlorobenzene	20.00	0.00	23.44	22.93	117	115	57-128	YES	2	30.00
Hexachlorobutadiene	20.00	0.00	22.30	19.83	112	99	67-155	YES	12	30.00
Naphthalene	20.00	0.00	25.90	23.81	130	119	22-149	YES	8	30.00
1,2,3-Trichlorobenzene	20.00	0.00	26.51	26.04	132	130	44-134	YES	2	30.00

N/C = Could not calculate

Lab Chronicle: \_\_\_\_\_ Ent. by \_\_\_\_\_

Ver. by \_\_\_\_\_

\* The %RPD for this compound exceeds requirements.

Lancaster Laboratories, Inc.  
GC/MS Volatiles Laboratory Control Sample Recovery

File: "JAK06

Inst: HP03047

Dilution Factor: 1.0

Injected: 04/20/98 at 15:25

Sample: LCSJ13 LCSJ13

Method: 8250 5mL +SPEC

Matrix/level: WL

Batch: J981101AA

COMPOUND NAME	SPIKE LEVEL	LCS CONC UG/L	LCS REC %	RANGE LOWER-UPPER	IN SPEC
Dichlorodifluoromethane	20.00	21.03	105	57- 144	YES
Chloromethane	20.00	20.24	101	58- 155	YES
Vinyl Chloride	20.00	22.05	110	74- 134	YES
Bromomethane	20.00	23.87	119	30- 154	YES
Chloroethane	20.00	22.35	112	38- 142	YES
Trichlorofluoromethane	20.00	32.96	165	73- 130	NO
Acetoin	150.00	132.03	88	22- 169	YES
1,1-Dichloroethene	20.00	22.74	114	38- 153	YES
Acetone	150.00	152.53	108	57- 117	YES
Carbon Disulfide	150.00	158.39	112	41- 186	YES
Methylene Chloride	20.00	20.93	105	57- 132	YES
Acrylonitrile	150.00	151.08	107	65- 132	YES
trans-1,2-Dichloroethene	20.00	21.33	107	34- 148	YES
Methyl t-Butyl Ether	20.00	19.71	98	30- 200	YES
1,1-Dichloroethane	20.00	22.03	110	59- 132	YES
2,2-Dichloropropane	20.00	23.37	117	76- 118	YES
cis-1,2-Dichloroethene	20.00	21.58	108	63- 130	YES
2-Putanone	150.00	174.93	117	63- 120	YES
Chloroform	20.00	22.14	111	73- 126	YES
Bromoform	20.00	15.94	85	68- 115	YES
1,1,1-Trichloroethane	20.00	22.82	114	65- 139	YES
Carbon Tetrachloride	20.00	21.70	108	61- 139	YES
1,1-Dichloropropene	20.00	22.37	112	47- 140	YES
Benzene	20.00	21.27	106	58- 133	YES
1,2-Dichloroethane	20.00	21.40	107	68- 125	YES
Trichloroethene	20.00	21.57	108	67- 130	YES
1,1-Dichloropropane	20.00	21.50	108	70- 123	YES
Difluoromethane	20.00	20.98	105	67- 124	YES
Bromodichloromethane	20.00	21.64	108	64- 123	YES
2-Chloroethyl Vinyl Ether	20.00	19.50	98	30- 200	YES
cis-1,3-Dichloropropene	20.00	22.03	110	66- 124	YES
4-Methyl-2-Pentanone	100.00	105.03	106	73- 125	YES
Toluene	20.00	21.73	109	63- 143	YES
trans-1,3-Dichloropropene	20.00	20.96	105	66- 125	YES
1,1,2-Trichloroethane	20.00	20.94	105	72- 119	YES

Lab Chronicle:

Ent. by \_\_\_\_\_

Ver. by \_\_\_\_\_

Lancaster Laboratories, Inc.  
GC/MS Volatiles Laboratory Control Sample Recovery

File: ^JAK06                  Injected: 04/20/98 at 15:25                  Method: 8260 5mL +SPEC  
 Inst: HP03047                  Sample: LCSJ13                  Matrix/level: WL  
 Dilution Factor: 1.0                  Batch: J981101AA

COMPOUND NAME	SPIKE LEVEL	LCS CONC UG/L	LCS REC %	RANGE LOWER-UPPER	IN SPEC
Tetrachloroethene	20.00	23.86	119	62- 150	YES
1,3-Dichloropropane	20.00	21.23	105	67- 123	YES
2-Hexanone	100.00	103.82	104	65- 125	YES
Dibromochloromethane	20.00	20.27	101	69- 115	YES
1,2-Dibromoethane	20.00	20.55	103	66- 122	YES
Chlorobenzene	20.00	21.13	105	74- 120	YES
1,1,1,2-Tetrachloroethane	20.00	21.48	107	77- 122	YES
Ethylbenzene	20.00	22.04	110	70- 132	YES
m+p-Xylene	40.00	42.92	107	68- 135	YES
o-Xylene	20.00	21.67	108	68- 132	YES
Styrene	20.00	21.51	108	74- 127	YES
Bromoform	20.00	19.36	97	70- 114	YES
Isopropylbenzene	20.00	21.34	107	74- 138	YES
1,1,2,2-Tetrachloroethane	20.00	20.65	103	70- 119	YES
Bromobenzene	20.00	20.58	103	74- 118	YES
1,2,3-Trichloropropane	20.00	20.30	102	66- 125	YES
n-Propylbenzene	20.00	22.10	110	69- 145	YES
2-Chlorotoluene	20.00	21.79	109	71- 132	YES
1,3,5-Trimethylbenzene	20.00	21.81	109	66- 135	YES
4-Chlorotoluene	20.00	22.17	111	65- 133	YES
tert-Butylbenzene	20.00	20.78	104	75- 133	YES
1,2,4-Trimethylbenzene	20.00	21.54	108	61- 136	YES
sec-Butylbenzene	20.00	21.50	108	64- 140	YES
p-Isopropyltoluene	20.00	21.44	107	68- 144	YES
1,3-Dichlorobenzene	20.00	20.51	102	42- 150	YES
1,4-Dichlorobenzene	20.00	20.38	102	42- 150	YES
n-Butylbenzene	20.00	21.88	109	63- 148	YES
1,2-Dichlorobenzene	20.00	20.72	104	49- 139	YES
1,2-Dibromo-3-Chloropropane	20.00	24.50	122	51- 120	NO
1,2,4-Trichlorobenzene	20.00	13.73	69	52- 128	YES
Hexachlorobutadiene	20.00	17.43	87	63- 140	YES
Naphthalene	20.00	13.59	68	50- 122	YES
1,2,3-Trichlorobenzene	20.00	10.25	51	52- 131	NO

Lab Chronicle: \_\_\_\_\_

Ent. by \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Ver. by \_\_\_\_\_

1E  
VOLATILE ORGANICS ANALYSIS DATA SHEET  
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

00448

Lab Name: LANCASTER LABS

Contract: \_\_\_\_\_

Lab Code: LANCAS Case No.: \_\_\_\_\_. SAS No.: \_\_\_\_\_. SDG No.: \_\_\_\_\_.

Matrix: (soil/water) SOIL

Lab Sample ID: 2916270

Sample wt/vol: 11.5 (g/mL) G

Lab File ID: >IY316

Level: (low/med) MED

Date Received: 04/23/98

% Moisture: not dec. 16

Date Analyzed: 05/04/98

Column: (pack/cap) CAP

Dilution Factor: .9

Number TICs found: 10

CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	Unknown alkane	14.57	30000.	J
2.	C9H12 aromatic	17.14	47000.	J
3.	C9H12 aromatic	17.26	44000.	J
4.	C9H12 aromatic	17.56	28000.	J
5.	C9H12 aromatic	17.82	55000.	J
6.	C10H14 aromatic	18.43	37000.	J
7.	C10H14 aromatic	18.75	39000.	J
8.	C10H14 aromatic	18.84	33000.	J
9.	C10H14 aromatic	19.30	21000.	J
10.	C10H14 aromatic	19.41	25000.	J
11.				
12.				
13.				
14.				
15.				
16.				
17.				
18.				
19.				
20.				
21.				
22.				
23.				
24.				
25.				

6A  
VOLATILE ORGANICS INITIAL CALIBRATION DATA

Lab Name: LANCASTER LABS

Contract: \_\_\_\_\_

Lab Code: LANCAS Case No.: \_\_\_\_\_. SAS No.: \_\_\_\_\_. SDG No.: \_\_\_\_\_

Instrument ID: HP03047 Calibration Date(s): 04/22/98 04/23/98

Calibration Times: 2048 0308

Matrix: (soil/water) WATER Level: (low/med) LOW Column: (pack/cap) CAP

Min RRF for SPCC(#) = 0.300 (0.10 for Bromoform, Chloromethane, and 1,1-Dichloroethane) Max %RSD for CCC(+) = 30.0%

LAB FILE ID:	RRF 4- >JAMIG	RRF 10- >JAMIH	RRF 20- >JAMII	CAL.
	RRF 50- >JAMID	RRF100- >JAMIE	RRF300- >JAMIF	
COMPOUND	RRF 4 RRF 10 RRF 20 RRF 50 RRF100 RRF300	RRF   RSD   METHOD		
Dichlorodifluoromethane	.445 .397 .394 .400 .397 .413 .408  4.8   AVG			
Chloromethane	# .274 .278 .273 .252 .245 .249 .252  5.6   AVG #			
Vinyl Chloride	* .271 .291 .285 .274 .272 .271 .277  3.1   AVG			
Bromomethane	.260 .273 .267 .250 .249 .242 .257  4.7   AVG			
Chloroethane	.181 .205 .200 .175 .196 .155 .184  9.8   AVG			
Trichlorofluoromethane	.187 .212 .208 .173 .211 .250 .207  12.8   AVG			
Ethyl Ether	.238 .227 .229 .213 .217 .211 .222  4.7   AVG			
Acrolein	.029 .030 .031 .028 .029 .030 .030  3.2   AVG			
1,1-Dichloroethene	* .242 .248 .243 .252 .249 .244 .245  1.6   AVG *			
Acetone	* .079 .059 .054 .043 .044 .042 .053  26.5   AVG *			
Methyl Iodide	.539 .538 .523 .543 .545 .551 .541  1.9   AVG			
Carbon Disulfide	.733 .716 .685 .411 .540 .611 .615  20.1   2NDDEG			
2-Propanol	.009 .012 .012 .011 .011 .011 .011  8.4   AVG			
Allyl Chloride	.481 .444 .423 .402 .406 .375 .422  8.8   AVG			
Methylene Chloride	.304 .293 .295 .276 .279 .280 .285  3.7   AVG			
Acrylonitrile	.063 .060 .063 .057 .060 .060 .061  3.6   AVG			
trans-1,2-Dichloroethene	.274 .275 .271 .272 .275 .257 .272  1.2   AVG			
t-Butyl Alcohol	.019 .022 .022 .022 .023 .022 .022  7.1   AVG			
Methyl t-Butyl Ether	.741 .703 .713 .656 .679 .662 .692  4.7   AVG			
n-Hexane	.395 .380 .359 .406 .411 .405 .393  5.1   AVG			
1,1-Dichloroethane	# .514 .514 .511 .502 .518 .506 .511  1.1   AVG #			
Vinyl Acetate	.660 .621 .641 .600 .620 .595 .623  4.0   AVG			
2-Chloro-1,3-Butadiene	.359 .357 .370 .374 .376 .367 .367  2.2   AVG			
2,2-Dichloropropane	.312 .320 .308 .315 .317 .305 .313  1.9   AVG			
cis-1,2-Dichloroethene	.298 .290 .284 .283 .287 .283 .287  2.1   AVG			
2-Butanone	.113 .095 .096 .086 .087 .085 .094  13.1   AVG			
Propionitrile	.024 .022 .024 .021 .023 .022 .023  4.1   AVG			
Methacrylonitrile	.090 .083 .087 .079 .083 .080 .083  5.5   AVG			
Tetrahydrofuran	.055 .062 .064 .058 .059 .055 .059  6.0   AVG			
Chloroform	* .553 .526 .510 .514 .516 .508 .521  3.3   AVG *			
Bromoform	.169 .179 .174 .166 .169 .169 .171  2.7   AVG			
1,1,1-Trichloroethane	.352 .358 .360 .372 .377 .313 .355  6.4   AVG			
Cyclohexane	.460 .446 .432 .447 .448 .451 .447  2.0   AVG			

\*- Average response factor used due to poor curve fit.

6A  
VOLATILE ORGANICS INITIAL CALIBRATION DATA

Lab Name: LANCASTER LABS Contract: \_\_\_\_\_

Lab Code: LANCAS Case No.: \_\_\_\_\_. SAS No.: \_\_\_\_\_. SDG No.: \_\_\_\_\_

Instrument ID: HP03047 Calibration Date(s): 04/22/98 04/23/98

Calibration Times: 2043 0308

Matrix: (soil/water) WATER Level: (low/med) LOW Column: (pack/cap) CAP

Min RRF for SPCC(#) = 0.300 (0.10 for Bromoform, Chloromethane, and 1,1-Dichloroethane Max %RSD for CCC(+) = 30.0%

LAB FILE ID:	RRF 4- >JAMIG				RRF 10- >JAMIN				RRF 20- >JAMIZ			
	RRF 50- >JAMID				RRF100- >JAMIE				RRF300- >JAMIF			
COMPOUND	RRF 4	RRF 10	RRF 20	RRF 50	RRF100	RRF300	RRF	RSD	RRF	RSD	RRF	METHOD
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Carbon Tetrachloride	.309	.308	.307	.327	.329	.334	.319	3.9	.284	16.5	2NDDEG	
1,1-Dichloropropene	.399	.384	.382	.387	.390	.395	.393	1.6	.284	9.3	AVG	
Isobutyl Alcohol	.005	.006	.006	.006	.005	.005	.005	8.1	.284	2.1	AVG	
Benzene	.864	.851	.820	.814	.821	.808	.830	2.7	.284	1.5	AVG	
1,2-Dichloroethane	.294	.299	.296	.291	.300	.298	.295	1.5	.284	2.4	AVG	
n-Heptane	.375	.291	.245	.270	.265	.258	.284	16.5	.284	2.1	AVG	
n-Butanol	.004	.005	.006	.005	.006	.006	.005	9.3	.284	2.1	AVG	
Trichloroethene	.326	.314	.309	.322	.322	.312	.317	2.1	.284	5.3	AVG	
1,2-Dichloropropane	.365	.358	.357	.349	.355	.340	.354	2.4	.284	2.1	AVG	
Methyl Methacrylate	.223	.202	.220	.200	.210	.196	.209	5.3	.284	2.1	AVG	
Dibromomethane	.293	.277	.286	.277	.282	.269	.279	2.1	.284	2.1	AVG	
1,4-Dioxane	.001	.002	.002	.002	.003	.002	.002	23.6	.284	2.1	1STDEG	
n-Propyl Acetate	.157	.147	.153	.140	.146	.136	.145	5.4	.284	2.1	AVG	
Bromodichloromethane	.457	.493	.494	.493	.493	.489	.484	2.8	.284	2.1	AVG	
2-Nitropropane	.074	.044	.045	.041	.043	.042	.048	26.5	.284	2.1	2NDDEG	
2-Chloroethyl Vinyl Ether	.214	.188	.196	.186	.192	.189	.194	5.3	.284	2.1	AVG	
cis-1,3-Dichloropropene	.477	.482	.484	.479	.492	.478	.482	1.2	.284	2.1	AVG	
4-Methyl-2-Pentanone	.319	.268	.280	.245	.256	.243	.269	10.5	.284	2.1	AVG	
Toluene	.795	.747	.748	.753	.752	.730	.754	2.9	.284	2.1	AVG	
trans-1,3-Dichloropropene	.591	.583	.582	.587	.591	.586	.588	1.2	.284	2.1	AVG	
Ethyl Methacrylate	.743	.670	.686	.638	.672	.643	.675	5.6	.284	2.1	AVG	
1,1,2-Trichloroethane	.400	.385	.391	.374	.380	.367	.383	3.1	.284	2.1	AVG	
Tetrachloroethene	.377	.370	.362	.383	.381	.370	.375	2.5	.284	2.1	AVG	
1,3-Dichloropropane	.733	.723	.720	.691	.695	.628	.695	5.6	.284	2.1	AVG	
2-Hexanone	.367	.294	.294	.241	.250	.241	.279	17.3	.284	2.1	2NDDEG	
Dibromochloromethane	.514	.571	.573	.522	.522	.558	.543	4.9	.284	2.1	AVG	
1,2-Dibromoethane	.579	.576	.576	.549	.565	.546	.555	2.5	.284	2.1	AVG	
Chlorobenzene	# .881	.883	.859	.870	.875	.844	.869	1.7	.284	2.1	AVG	#
1,1,1,2-Tetrachloroethane	# .401	.411	.395	.403	.410	.392	.403	1.8	.284	2.1	AVG	#
Ethylbenzene	# 1.607	1.567	1.506	1.535	1.520	1.397	1.522	4.7	.284	2.1	AVG	#
m,p-Xylene	# .532	.529	.518	.526	.524	.506	.523	1.8	.284	2.1	AVG	#
o-Xylene	# .500	.502	.493	.502	.504	.472	.496	2.5	.284	2.1	AVG	#
Styrene	# .870	.901	.900	.906	.916	.858	.892	2.5	.284	2.1	AVG	#
Bromoform	# .184	.273	.293	.263	.271	.313	.266	16.6	.284	2.1	2NDDEG	#

6A  
VOLATILE ORGANICS INITIAL CALIBRATION DATA

Lab Name: LANCASTER LABS Contract: \_\_\_\_\_

Lab Code: LANCAS Case No.: \_\_\_\_\_ SAS No. \_\_\_\_\_ SDG No. \_\_\_\_\_

Instrument ID: HP03047 Calibration Date(s): 04/22/98 04/23/98

Calibration Times: 2048 0308

Matrix: (soil/water) WATER Level: (low/med) LCW Column: (pack/cap) CAP

Min RRF for SPCC(%) = 0.300 (0.10 for Bromoform, Chloromethane, and 1,1-Dichloroethane) Max tRSD for CCC(%) = 30.0

LAB FILE ID:	RRF 4- >JAMIG	RRF 10- >JAMIH	RRF 20- >JAMII							
	RRF 50- >JAMID	RRF100- >JAMIE	RRF300- >JAMIF							
COMPOUND	RRF 4	RRF 10	RRF 20	RRF 50	RRF100	RRF300	RRF	RSD	CAL.	METHOD
Isopropylbenzene	1.438	1.456	1.402	1.452	1.470	1.402	1.437	2.0	Avg	
trans-1,4-Dichloro-2-Butene	.117	.129	.132	.122	.123	.108	.125	8.2	Avg	
1,1,2,2-Tetrachloroethane	# 1.377	1.357	1.405	1.260	1.307	1.220	1.321	5.4	Avg	
Bromobenzene	.775	.762	.759	.745	.757	.725	.754	2.3	Avg	
1,2,3-Trichloropropane	.277	.287	.295	.266	.278	.248	.275	6.0	Avg	
n-Propylbenzene	4.059	3.968	3.785	3.851	3.887	3.655	3.857	3.6	Avg	
2-Chlorotoluene	2.729	2.631	2.482	2.526	2.493	2.331	2.532	5.4	Avg	
1,3,5-Trimethylbenzene	2.493	2.475	2.366	2.419	2.413	2.275	2.407	3.3	Avg	
4-Chlorotoluene	3.028	2.989	2.934	2.833	2.854	2.663	2.933	4.6	Avg	
tert-Butylbenzene	.506	.555	.530	.528	.531	.493	.524	4.1	Avg	
Pentachloroethane	.496	.539	.544	.543	.557	.506	.531	4.5	Avg	
1,2,4-Trimethylbenzene	2.566	2.537	2.451	2.430	2.433	2.185	2.434	5.5	Avg	
sec-Butylbenzene	3.636	3.483	3.327	3.434	3.411	3.267	3.426	3.8	Avg	
p-Isopropyltoluene	2.739	2.655	2.519	2.624	2.602	2.379	2.536	4.8	Avg	
1,3-Dichlorobenzene	1.395	1.351	1.274	1.261	1.294	1.225	1.293	4.8	Avg	
1,4-Dichlorobenzene	1.507	1.482	1.446	1.435	1.439	1.390	1.450	2.8	Avg	
n-Butylbenzene	3.432	3.086	2.853	3.014	2.947	2.746	3.013	7.9	Avg	
1,2-Dichlorobenzene	1.281	1.262	1.231	1.197	1.223	1.159	1.225	3.6	Avg	
1,2-Dibromo-3-Chloropropane	.189	.185	.210	.161	.167	.165	.180	10.5	Avg	
1,2,4-Trichlorobenzene	.574	.534	.523	.447	.470	.458	.501	10.0	Avg	
Hexachlorobutadiene	.512	.415	.360	.358	.360	.356	.393	15.9	1STDEG	
Naphthalene	.996	.827	.897	.617	.655	.643	.756	17.0	2NDDEG	
1,2,3-Trichlorobenzene	.329	.289	.284	.211	.225	.214	.259	18.8	2NDDEG	
Dibromofluoromethane	.393	.434	.436	.446	.454	.433	.433	4.4	Avg	
1,2-Dichloroethane-d4	.261	.272	.278	.280	.283	.253	.271	4.4	Avg	
Toluene-d8	1.163	1.220	1.223	1.241	1.251	1.298	1.234	3.5	Avg	
4-Bromofluorobenzene	.817	.799	.780	.783	.787	.801	.795	1.7	Avg	

7A  
VOLATILE CONTINUING CALIBRATION CHECK

Lab Name: LANCASTER LABS

Contract: \_\_\_\_\_.

Lab Code: LANCAS

Case No.: \_\_\_\_\_. SAS No.: \_\_\_\_\_. SDG No.: \_\_\_\_\_.

Instrument ID: HP03047

Calibration Date: 04/20/98 Time: 1013

Lab File ID: >JAKS2

Init. Calib. Date(s): 04/13/98 04/14/98

Matrix: (soil/water) WATER Level: (low/med) LOW Column: (pack/cap) CAP

Min RRF50 for SPCC(#) = 0.300 (0.10 for Bromoform) Max %Drift for CCC(\*) = 20.0%

COMPOUND	RRF	RRF 50	ACTUAL CONC.	TRUE CONC.	% DRIFT
Dichlorodifluoromethane	.350	.475	59.45	50.0	-18.9
Chloromethane	# .234	.272	58.18	50.0	-16.4#
Vinyl Chloride	* .249	.280	56.17	50.0	-12.3*
Bromomethane	.249	.287	57.53	50.0	-15.1
Chloroethane	.161	.189	58.52	50.0	-17.0
Trichlorofluoromethane	.240	.407	72.47	50.0	-44.9
Acrolein	.034	.028	409.34	500.0	18.1
1,1-Dichloroethene	* .249	.244	48.87	50.0	2.3*
Acetone	.045	.043	104.57	100.0	-4.6
Carbon Disulfide	.772	.709	45.94	50.0	8.1
Methylene Chloride	.284	.275	48.30	50.0	3.4
Acrylonitrile	.058	.060	520.52	500.0	-4.1
trans-1,2-Dichloroethene	.282	.280	49.64	50.0	.7
Methyl t-Butyl Ether	.663	.668	50.40	50.0	-.8
1,1-Dichloroethane	# .490	.498	50.83	50.0	-1.7#
2,2-Dichloropropane	.345	.372	53.89	50.0	-7.8
cis-1,2-Dichloroethene	.299	.302	50.43	50.0	-.9
2-Butanone	.085	.090	105.54	100.0	-5.5
Chloroform	* .502	.526	52.35	50.0	-4.7*
Bromochloromethane	.174	.169	48.70	50.0	2.6
1,1,1-Trichloroethane	.389	.408	52.40	50.0	-4.8
Carbon Tetrachloride	.352	.366	52.01	50.0	-4.0
1,1-Dichloropropene	.383	.403	52.57	50.0	-5.1
Benzene	.832	.840	50.46	50.0	-.9
1,2-Dichloroethane	.280	.302	53.90	50.0	-7.8
Trichloroethene	.331	.334	50.41	50.0	-.8
1,2-Dichloropropane	* .342	.352	51.39	50.0	-2.8*
Dibromomethane	.272	.287	52.77	50.0	-5.5
Bromodichloromethane	.492	.522	53.10	50.0	-6.2
2-Chloroethyl Vinyl Ether	.206	.200	97.16	100.0	2.8
cis-1,3-Dichloropropene	.463	.486	52.43	50.0	-4.9
4-Methyl-2-Pentanone	.263	.266	101.00	100.0	-1.0
Toluene	* .783	.770	49.16	50.0	1.7*
trans-1,3-Dichloropropene	.548	.567	51.75	50.0	-3.5

Chlcromethane, 1,1-Dichloroethane and Bromoform must meet a minimum RRF of .10.

7A  
VOLATILE CONTINUING CALIBRATION CHECK

Lab Name: LANCASTER LABS Contract: \_\_\_\_\_.

Lab Code: LANCAS Case No.: \_\_\_\_\_. SAS No.: \_\_\_\_\_. SDG No.: \_\_\_\_\_.

Instrument ID: HP03047 Calibration Date: 04/20/98 Time: 1013

Lab File ID: >JAKS2 Init. Calib. Date(s): 04/13/98 04/14/98

Matrix: (soil/water) WATER Level: (low/med) LOW Column: (pack/cap) CAP

Min RRF50 for SPCC(#) = 0.300 (0.10 for Bromoform) Max %Drift for CCC(\*) = 20.0%

COMPOUND	RRF	RRF 50	ACTUAL CONC.	TRUE CONC.	% DRIFT
1,1,2-Trichloroethane	.359	.364	50.70	50.0	-1.4
Tetrachloroethene	.448	.436	48.73	50.0	2.5
1,3-Dichloropropane	.635	.655	51.59	50.0	-3.2
2-Hexanone	.244	.252	103.15	100.0	-3.1
Dibromochloromethane	.591	.608	51.42	50.0	-2.8
1,2-Dibromoethane	.551	.563	51.01	50.0	-2.0
Chlorobenzene	# .924	.923	49.96	50.0	.1#
1,1,1,2-Tetrachloroethane	.421	.434	51.53	50.0	-3.1
Ethylbenzene	* 1.509	1.569	51.99	50.0	-4.0*
m+p-Xylene	.550	.563	102.26	100.0	-2.3
o-Xylene	.522	.537	51.46	50.0	-2.9
Styrene	.942	.958	50.84	50.0	-1.7
Bromoform	# .357	.360	50.47	50.0	-.9#
Isopropylbenzene	1.531	1.534	50.12	50.0	-.2
1,1,2,2-Tetrachloroethane	# 1.113	1.192	53.58	50.0	-7.2#
Bromobenzene	.820	.821	50.05	50.0	-.1
1,2,3-Trichloropropane	.253	.267	52.89	50.0	-5.8
n-Propylbenzene	3.714	3.871	52.12	50.0	-4.2
2-Chlorotoluene	2.348	2.410	51.32	50.0	-2.6
1,3,5-Trimethylbenzene	2.391	2.426	50.74	50.0	-1.5
4-Chlorotoluene	2.678	2.793	52.16	50.0	-4.3
tert-Butylbenzene	.581	.563	48.42	50.0	3.2
1,2,4-Trimethylbenzene	2.411	2.464	51.10	50.0	-2.2
sec-Butylbenzene	3.466	3.478	50.17	50.0	-.3
p-Isopropyltoluene	2.692	2.692	50.00	50.0	-.0
1,3-Dichlorobenzene	1.378	1.390	50.42	50.0	-.8
1,4-Dichlorobenzene	1.539	1.528	49.63	50.0	.7
n-Butylbenzene	2.888	2.979	51.57	50.0	-3.1
1,2-Dichlorobenzene	1.250	1.266	50.64	50.0	-1.3
1,2-Dibromo-3-Chloropropane	.091	.124	67.85	50.0	-35.7
1,2,4-Trichlorobenzene	.375	.319	42.49	50.0	15.0
Hexachlorobutadiene	.402	.292	36.29	50.0	27.4
Naphthalene	.396	.379	47.86	50.0	4.3
1,2,3-Trichlorobenzene	.152	.110	36.12	50.0	27.8
Dibromofluoromethane	.455	.454	49.88	50.0	.2
1,2-Dichloroethane-d4	.245	.267	54.39	50.0	-8.8
Toluene-d8	1.193	1.163	48.73	50.0	2.5
4-Bromofluorobenzene	.765	.703	45.96	50.0	8.1

Chloromethane, 1,1-Dichloroethane and Bromoform must meet a minimum RRF of .10.

5B  
 SEMIVOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK  
 DECAFLUOROTRIPHENYLPHOSPHINE (DFTPP)

Lab Name: LANCASTER LABS

Contract: \_\_\_\_\_.

Lab Code: LANCAS Case No.: \_\_\_\_\_. SAS No.: \_\_\_\_\_. SDG No.: \_\_\_\_\_.

Lab File ID: >Z730Z

DFTPP Injection Date: 07/05/95

Instrument ID: HP02550

DFTPP Injection Time: 15:40

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
51	30.0 - 80.0% of mass 198	58.0
68	Less than 2.0% of mass 69	0.0 ( 0.0)1
69	Mass 69 relative abundance	66.2
70	Less than 2.0% of mass 69	0.0 ( 0.0)1
127	25.0 - 75.0% of mass 198	44.0
197	Less than 1.0% of mass 198	0.0
198	Base Peak, 100% relative abundance	100.
199	5.0 to 9.0% of mass 198	6.6
275	10.0 - 30.0% of mass 198	19.9
365	Greater than 0.75% of mass 198	1.87
441	Present, but less than mass 443	8.8
442	40.0 - 110.0% of mass 198	59.9
443	15.0 - 24.0% of mass 442	11.4 ( 19.0)2

1-Value is % mass 69

2-Value is % mass 442

THIS TUNE APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	SSTD50	CLP1815	>Z7301	07/05/95	16:08
02	0303BMSD	2337099	>C7301	07/05/95	18:14
03	0400B	2337092	>C7302	07/05/95	19:07
04	0303BMS	2337098	>C7304	07/05/95	21:44
05	0405B	2337094	>C7305	07/05/95	22:45
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					

2C  
WATER SEMIVOLATILE SURROGATE RECOVERY

Lab Name: LANCASTER LABS

Contract: \_\_\_\_\_

Lab Code: LANCAS Case No.: \_\_\_\_\_. SAS No.: \_\_\_\_\_. SDG No.: \_\_\_\_\_

	EPA SAMPLE NO.	S1 (NBZ) #	S2 (FBP) #	S3 (TPH) #	S4 (PHL) #	S5 (2FP) #	S6 (TBP) #	OTHER	TOT OUT
01	SBLKWA1714	75	78	77	38	54	89		0
02	171WALCS	86	85	88	43	61	108		0
03	171WALCSD	91	85	92	42	60	103		0
04	171WAUS	88	86	73	43	62	103		0
05	171WAMS	93	88	92	44	64	106		0
06	171WAMSD	85	83	94	41	58	106		0
07	SEDFB	81	83	80	37	56	81		0
08	SDFB2	79	81	76	37	58	78		0
09	NVBRM	59	80	70	39	59	90		0
10	2HP6-	80	85	74	38	59	77		0
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									

QC LIMITS

S1 (NBZ) = Nitrobenzene-d5	(35-114)
S2 (FBP) = 2-Fluorobiphenyl	(43-116)
S3 (TPH) = Terphenyl-d14	(33-141)
S4 (PHL) = Phenol-d6	(10-94)
S5 (2FP) = 2-Fluorophenol	(21-100)
S6 (TBP) = 2,4,6-Tribromophenol	(10-123)

# Column to be used to flag recovery values

\* Values outside of contract required QC limits

D Surrogates diluted out

4B  
SEMIVOLATILE METHOD BLANK SUMMARY

Lab Name: LANCASTER LABS Contract: \_\_\_\_\_.  
Lab Code: LANCAS Case No.: \_\_\_\_\_. SAS No.: \_\_\_\_\_. SDG No.: \_\_\_\_\_.  
Lab File ID: >D3750 Lab Sample ID: SBLKWA171  
Date Extracted: 06/20/95 Extraction: (SepF/Cont/Sonc) SEPF  
Date Analyzed: 06/21/95 Time Analyzed: 13:00  
Matrix: (soil/water) WATER Level: (low/med) LOW  
Instrument ID: HP03301

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
01	171WALCS	171WALCS	>D3751	06/21/95
02	171WALCSD	171WALCSD	>D3752	06/21/95
03	171WAUS	171WAUS	>D3753	06/21/95
04	171WAMS	171WAMS	>D3754	06/21/95
05	171WAMSD	171WAMSD	>D3755	06/21/95
06	SEDFB	2329395	>D3801	06/22/95
07	SDFB2	2330033	>D3802	06/22/95
08	NVBRM	2325395	>D3803	06/22/95
09	2HP6-	2330176	>D3804	06/22/95

COMMENTS: \_\_\_\_\_

1B  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SBLKWA1714

Lab Name: LANCASTER LABS

Contract: \_\_\_\_\_

Lab Code: LANCAS Case No.: \_\_\_\_\_. SAS No.: \_\_\_\_\_. SDG No.: \_\_\_\_\_

Matrix: (soil/water) WATER

Lab Sample ID: SBLKWA171

Sample wt/vol: 1000 (g/mL) ML

Lab File ID: >D3750

Level: (low/med) LOW

Date Received:

% Moisture: not dec. \_\_\_\_\_. dec. \_\_\_\_\_

Date Extracted: 06/20/95

Extraction: (SepF/Cont/Sonc) SEPF

Date Analyzed: 06/21/95

GPC Cleanup: (Y/N) N pH: \_\_\_\_\_. Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS:	
		(ug/L or ug/Kg)	UG/L

110-86-1-----	Pyridine	10	U
62-75-9-----	N-Nitrosodimethylamine	10	U
108-95-2-----	Phenol	10	U
111-44-4-----	bis(2-Chloroethyl)ether	10	U
95-57-8-----	2-Chlorophenol	10	U
541-73-1-----	1,3-Dichlorobenzene	10	U
106-46-7-----	1,4-Dichlorobenzene	10	U
95-50-1-----	1,2-Dichlorobenzene	10	U
95-48-7-----	2-Methylphenol	10	U
108-60-1-----	bis(2-Chloroisopropyl)ether	10	U
65794-96-9-----	3 or 4-Methylphenol	10	U
621-64-7-----	N-Nitroso-di-n-propylamine	10	U
67-72-1-----	Hexachloroethane	10	U
98-95-3-----	Nitrobenzene	10	U
78-59-1-----	Isophorone	10	U
88-75-5-----	2-Nitrophenol	10	U
105-67-9-----	2,4-Dimethylphenol	10	U
111-91-1-----	bis(2-Chloroethoxy)methane	10	U
120-83-2-----	2,4-Dichlorophenol	10	U
120-82-1-----	1,2,4-Trichlorobenzene	10	U
91-20-3-----	Naphthalene	10	U
87-68-3-----	Hexachlorobutadiene	10	U
59-50-7-----	4-Chloro-3-methylphenol	10	U
77-47-4-----	Hexachlorocyclopentadiene	10	U
88-06-2-----	2,4,6-Trichlorophenol	10	U
95-95-4-----	2,4,5-Trichlorophenol	10	U
91-58-7-----	2-Chloronaphthalene	10	U
131-11-3-----	Dimethylphthalate	10	U
606-20-2-----	2,6-Dinitrotoluene	10	U
208-96-8-----	Acenaphthylene	10	U
83-32-9-----	Acenaphthene	10	U
51-28-5-----	2,4-Dinitrophenol	25	U
100-02-7-----	4-Nitrophenol	25	U

1C  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SBLKWA1714

Lab Name: LANCASTER LABS Contract: \_\_\_\_\_.  
 Lab Code: LANCAS Case No.: \_\_\_\_\_. SAS No.: \_\_\_\_\_. SDG No.: \_\_\_\_\_.  
 Matrix: (soil/water) WATER Lab Sample ID: SBLKWA171  
 Sample wt/vol: 1000 (g/mL) ML Lab File ID: >D3750  
 Level: (low/med) LOW Date Received:  
 % Moisture: not dec. \_\_\_\_\_. dec. \_\_\_\_\_. Date Extracted: 06/20/95  
 Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 06/21/95  
 GPC Cleanup: (Y/N) N pH: \_\_\_\_\_. Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
121-14-2-----	2,4-Dinitrotoluene _____	10	U
84-66-2-----	Diethylphthalate _____	10	U
7005-72-3-----	4-Chlorophenyl-phenylether _____	10	U
86-73-7-----	Fluorene _____	10	U
534-52-1-----	4,6-Dinitro-2-methylphenol _____	25	U
86-30-6-----	N-Nitrosodiphenylamine (1) _____	10	U
122-66-7-----	1,2-Diphenylhydrazine _____	10	U
101-55-3-----	4-Bromophenyl-phenylether _____	10	U
118-74-1-----	Hexachlorobenzene _____	10	U
87-86-5-----	Pentachlorophenol _____	25	U
85-01-8-----	Phenanthrene _____	10	U
120-12-7-----	Anthracene _____	10	U
84-74-2-----	Di-n-butylphthalate _____	10	U
206-44-0-----	Fluoranthene _____	10	U
92-87-5-----	Benzidine _____	50	U
129-00-0-----	Pyrene _____	10	U
85-68-7-----	Butylbenzylphthalate _____	10	U
91-94-1-----	3,3'-Dichlorobenzidine _____	20	U
56-55-3-----	Benzo(a)anthracene _____	10	U
117-81-7-----	bis(2-Ethylhexyl)phthalate _____	10	U
218-01-9-----	Chrysene _____	10	U
117-84-0-----	Di-n-octylphthalate _____	10	U
205-99-2-----	Benzo(b)fluoranthene _____	10	U
207-08-9-----	Benzo(k)fluoranthene _____	10	U
50-32-8-----	Benzo(a)pyrene _____	10	U
193-39-5-----	Indeno(1,2,3-cd)pyrene _____	10	U
53-70-3-----	Dibenz(a,h)anthracene _____	10	U
191-24-2-----	Benzo(g,h,i)perylene _____	10	U

(1) - Cannot be separated from Diphenylamine

<sup>3C</sup>  
WATER SEMIVOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: LANCASTER LABS Contract: \_\_\_\_\_.

Lab Code: LANCAS Case No.: \_\_\_\_\_. SAS No: \_\_\_\_\_. SDG No.: \_\_\_\_\_.

Matrix Spike - EPA Sample No.: SW-04

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	MS CONCENTRATION (ug/L)	MS % REC #	QC LIMIT REC.
Phenol	75.00	0.00	53.16	71	12-11
2-Chlorophenol	75.00	0.00	52.35	70	27-11
1,4-Dichlorobenzene	50.00	0.00	32.87	66	36-9
N-Nitroso-di-n-prop.(1)	50.00	0.00	32.76	66	41-11
1,2,4-Trichlorobenzene	50.00	0.00	33.89	68	39-8
4-Chloro-3-methylphenol	75.00	0.00	46.96	63	23-5
Acenaphthene	50.00	0.00	35.00	70	46-11
4-Nitrophenol	75.00	0.00	55.06	73	10-8
2,4-Dinitrotoluene	50.00	0.00	37.31	75	24-5
Pentachlorophenol	75.00	0.00	63.71	85	9-10
Pyrene	50.00	0.00	39.72	79	26-12

COMPOUND	SPIKE ADDED (ug/L)	MSD CONCENTRATION (ug/L)	MSD % REC #	% RPD #	QC LIMITS RPD	REC.
Phenol	75.00	49.33	66	7	42	12-11
2-Chlorophenol	75.00	48.42	65	7	40	27-12
1,4-Dichlorobenzene	50.00	29.99	60	10	28	36-5
N-Nitroso-di-n-prop.(1)	50.00	30.13	60	10	38	41-11
1,2,4-Trichlorobenzene	50.00	31.40	63	8	28	39-8
4-Chloro-3-methylphenol	75.00	44.71	60	5	42	23-9
Acenaphthene	50.00	32.25	65	7	31	46-11
4-Nitrophenol	75.00	58.37	78	7	50	10-8
2,4-Dinitrotoluene	50.00	35.96	72	4	38	24-5
Pentachlorophenol	75.00	64.38	86	1	50	9-10
Pyrene	50.00	39.34	79	0	31	26-12

(1) N-Nitroso-di-n-propylamine

# Column to be used to flag recovery and RPD values with an asterisk  
 \* Values outside of QC limits

RPD: 0 out of 11 outside limits

Spike Recovery: 0 out of 22 outside limits

COMMENTS: \_\_\_\_\_

## WATER SEMIVOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE SAMPLE RECOVERY

Lab Name: LANCASTER LABS

Lab Code: LANCAS

Instrument: HP03301

SW246 METHOD 8270

SPIKE LEVEL: 100 UG/ML

AMT USED: 1000.

SAMPLE SPIKE LEVEL: 100.UG/L % MOISTURE 0. DILUTION: 1

US SAMPLE: 171WAUS 171WAUS

MS SAMPLE: 171WAMS 171WAMS

MSD SAMPLE: 171WAMSD 171WAMSD

COMPOUND NAME	US CONC UG/L	MS CONC UG/L	MSD CONC UG/L	MS REC %	MSD REC %	RPD %	RANGE LOWER-UPPER	IN SPEC
N-Nitrosodimethylamine	0.00	71.19	63.55	71	64	11.00	35.0-100.8	YES
Phenol	0.00	50.36	47.69	50	48	5.00	5.0-112.0	YES
bis(2-Chloroethyl)ether	0.00	91.95	85.37	92	85	7.00	12.0-158.0	YES
2-Chlorophenol	0.00	93.27	87.54	93	88	6.00	23.0-134.0	YES
1,3-Dichlorobenzene	0.00	87.92	79.61	88	80	10.00	1.0-172.0	YES
1,4-Dichlorobenzene	0.00	89.59	81.76	90	82	9.00	20.0-124.0	YES
1,2-Dichlorobenzene	0.00	92.62	84.48	93	84	9.00	32.0-129.0	YES
bis(2-Chloroisopropyl)ether	0.00	98.40	92.17	98	92	7.00	36.0-166.0	YES
N-Nitroso-di-n-propylamine	0.00	110.79	104.31	111	104	6.00	1.0-230.0	YES
Hexachloroethane	0.00	80.42	73.16	80	73	9.00	40.0-113.0	YES
Nitrobenzene	0.00	100.44	93.63	100	94	7.00	35.0-180.0	YES
Iscphorone	0.00	91.13	86.68	91	87	5.00	21.0-196.0	YES
2-Nitrophenol	0.00	97.51	94.45	98	94	3.00	29.0-182.0	YES
2,4-Dimethylphenol	0.00	84.53	77.29	84	77	9.00	32.0-119.0	YES
bis(2-Chloroethoxy)methane	0.00	89.50	84.21	89	84	6.00	33.0-184.0	YES
2,4-Dichlorophenol	0.00	95.88	91.26	96	91	5.00	39.0-135.0	YES
1,2,4-Trichlorobenzene	0.00	89.02	82.33	89	82	8.00	44.0-142.0	YES
Naphthalene	0.00	90.10	83.34	90	83	8.00	21.0-133.0	YES
Hexachlorobutadiene	0.00	82.27	73.61	82	74	11.00	24.0-116.0	YES
4-Chloro-3-methylphenol	0.00	97.77	95.61	98	96	2.00	22.0-147.0	YES
Hexachlorocyclopentadiene	0.00	138.52	88.83	69	44	44.00	1.0-100.0	YES
2,4,6-Trichlorophenol	0.00	97.75	92.93	98	93	5.00	37.0-144.0	YES
2-Chloronaphthalene	0.00	89.52	85.35	90	85	5.00	60.0-118.0	YES
Dimethylphthalate	0.00	90.86	87.84	91	88	3.00	1.0-112.0	YES
2,6-Dinitrotoluene	0.00	86.36	84.61	86	85	2.00	50.0-158.0	YES
Acenaphthylene	0.00	90.55	85.28	90	85	6.00	33.0-145.0	YES
Acenaphthene	0.00	89.05	85.24	89	85	4.00	47.0-145.0	YES
2,4-Dinitrophenol	0.00	94.45	92.15	94	92	2.00	1.0-191.0	YES
4-Nitrophenol	0.00	47.71	46.64	48	47	2.00	1.0-132.0	YES
2,4-Dinitrotoluene	0.00	103.67	102.08	104	102	2.00	39.0-139.0	YES
1-Naphthylamine	0.00	41.80	36.84	42	37	13.00	1.0-100.0	YES
2-Naphthylamine	0.00	55.40	44.65	55	45	22.00	1.0-100.0	YES
Diethylphthalate	0.00	95.85	93.03	96	93	3.00	1.0-114.0	YES
4-Chlorophenyl-phenylether	0.00	92.22	88.60	92	88	4.00	25.0-158.0	YES
Florene	0.00	90.96	87.93	91	88	3.00	59.0-121.0	YES
4,6-Dinitro-2-methylphenol	0.00	88.46	86.50	88	86	2.00	1.0-181.0	YES
N-Nitrosodiphenylamine	0.00	86.53	83.21	86	83	4.00	37.8-147.0	YES
1,2-Diphenylhydrazine	0.00	86.10	82.37	86	82	4.00	25.7-124.9	YES
4-Bromophenyl-phenylether	0.00	92.83	88.97	93	89	4.00	53.0-127.0	YES

## WATER SEMIVOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE SAMPLE RECOVERY

Lab Name: LANCASTER LABS

Lab Code: LANCAS

Instrument: HP03301

SW846 METHOD 8270

SPIKE LEVEL: 100 UG/ML

AMT USED: 1000.

SAMPLE SPIKE LEVEL: 100.UG/L % MOISTURE 0. DILUTION: 1

US SAMPLE: 171WAUS 171WAUS MS SAMPLE: 171WAMS 171WAMS MSD SAMPLE: 171WAMSD 171WAMSD

COMPOUND NAME	US CONC UG/L	MS CONC UG/L	MSD CONC UG/L	MS REC %	MSD REC %	RPD %	RANGE LOWER-UPPER	IN SPEC
Hexachlorobenzene	0.00	93.90	90.89	94	91	3.00	1.0-152.0	YES
Pentachlorophenol	0.00	71.04	78.11	71	78	-9.00	14.0-176.0	YES
Phenanthrene	0.00	89.59	85.11	90	85	5.00	54.0-120.0	YES
Anthracene	0.00	88.13	84.06	88	84	5.00	27.0-133.0	YES
Di-n-butylphthalate	0.00	97.28	90.78	97	91	7.00	1.0-118.0	YES
Fluoranthene	0.00	97.82	92.76	98	93	5.00	26.0-137.0	YES
Benzidine	0.00	409.22	309.00	82	62	28.00	1.0-155.0	YES
Pyrene	0.00	86.40	89.91	86	90	-4.00	52.0-115.0	YES
Butylbenzylphthalate	0.00	94.76	93.22	95	93	2.00	1.0-152.0	YES
3,3'-Dichlorobenzidine	0.00	95.40	87.15	95	87	9.00	1.0-262.0	YES
Benzo(a)anthracene	0.00	89.52	86.79	90	87	3.00	33.0-143.0	YES
bis(2-Ethylhexyl)phthalate	0.00	94.36	92.14	94	92	2.00	8.0-158.0	YES
Chrysene	0.00	91.49	90.70	91	91	1.00	17.0-168.0	YES
Di-n-octylphthalate	0.00	90.04	93.87	90	94	-4.00	4.0-146.0	YES
Benzo(b)fluoranthene	0.00	88.77	89.34	89	89	-1.00	24.0-159.0	YES
Benzo(k)fluoranthene	0.00	90.41	89.11	90	89	1.00	11.0-163.0	YES
Benzo(a)pyrene	0.00	89.68	86.37	90	86	4.00	17.0-163.0	YES
Indeno(1,2,3-cd)pyrene	0.00	88.00	81.41	88	81	8.00	1.0-171.0	YES
Dibenz(a,h)anthracene	0.00	86.73	81.84	87	82	6.00	1.0-227.0	YES
Benzo(g,h,i)perylene	0.00	86.02	79.43	86	79	8.00	1.0-219.0	YES

COMMENTS: \_\_\_\_\_

## WATER SEMIVOLATILE QUALITY CONTROL REFERENCE SAMPLE RECOVERY

LAB NAME: LANCASTER LABS

LAB CODE: LANCAS

INSTRUMENT: HP03301

SW846 METHOD 8270 SPIKE LEVEL: 100 ug/L

LCS SAMPLE NO: 171WALCS 171WALCS

COMPOUND NAME	EXTRACT CONC UG/L	QCREF REC %	RANGE LOWER-UPPER	IN SPEC
N-Nitrosodimethylamine	68.92	69	35.0- 100.8	YES
Phenol	48.72	49	5.0- 112.0	YES
bis(2-Chloroethyl)ether	94.39	94	12.0- 158.0	YES
2-Chlorophenol	92.50	92	23.0- 134.0	YES
1,3-Dichlorobenzene	85.86	86	1.0- 172.0	YES
1,4-Dichlorobenzene	88.26	88	20.0- 124.0	YES
1,2-Dichlorobenzene	91.46	91	32.0- 129.0	YES
bis(2-Chloroisopropyl)ether	101.78	102	36.0- 166.0	YES
N-Nitroso-di-n-propylamine	110.79	111	1.0- 230.0	YES
Hexachloroethane	74.98	75	40.0- 113.0	YES
Nitrobenzene	99.22	99	35.0- 180.0	YES
Isophorone	92.80	93	21.0- 196.0	YES
2-Nitrophenol	91.79	92	29.0- 182.0	YES
2,4-Dimethylphenol	80.92	81	32.0- 119.0	YES
bis(2-Chloroethoxy)methane	90.28	90	33.0- 184.0	YES
2,4-Dichlorophenol	93.31	93	39.0- 135.0	YES
1,2,4-Trichlorobenzene	84.99	85	44.0- 142.0	YES
Naphthalene	88.58	88	21.0- 133.0	YES
Hexachlorobutadiene	71.61	72	24.0- 116.0	YES
4-Chloro-3-methylphenol	96.46	96	22.0- 147.0	YES
Hexachlorocyclopentadiene	115.53	58	1.0- 100.0	YES
2,4,6-Trichlorophenol	93.96	94	37.0- 144.0	YES
2-Chloronaphthalene	88.09	88	60.0- 118.0	YES
Dimethylphthalate	86.59	86	1.0- 112.0	YES
2,6-Dinitrotoluene	87.41	87	50.0- 158.0	YES
Acenaphthylene	87.90	88	33.0- 145.0	YES
Acenaphthene	87.91	88	47.0- 145.0	YES
2,4-Dinitrophenol	99.86	100	1.0- 191.0	YES
4-Nitrophenol	47.64	48	1.0- 132.0	YES
2,4-Dinitrotoluene	104.96	105	39.0- 139.0	YES
1-Naphthylamine	40.76	41	1.0- 100.0	YES
2-Naphthylamine	52.41	52	1.0- 100.0	YES
Diethylphthalate	96.64	97	1.0- 114.0	YES
4-Chlorophenyl-phenylether	91.82	92	25.0- 158.0	YES
Fluorene	91.73	92	59.0- 121.0	YES
4,6-Dinitro-2-methylphenol	88.46	88	1.0- 181.0	YES
N-Nitrosodiphenylamine	82.97	83	37.8- 147.0	YES
1,2-Diphenylhydrazine	87.54	88	25.7- 124.9	YES
4-Eromoethyl-phenylether	92.08	92	53.0- 127.0	YES

## WATER SEMIVOLATILE QUALITY CONTROL REFERENCE SAMPLE RECOVERY

LAB NAME: LANCASTER LABS

LAB CODE: LANCAS

INSTRUMENT: HP03301

SW846 METHOD 8270 SPIKE LEVEL: 100 ug/L

LCS SAMPLE NO: 171WALCS 171WALCS

COMPOUND NAME	EXTRACT CONC UG/L	QCREF REC %	RANGE LOWER-UPPER	IN SPEC
Hexachlorobenzene	94.46	94	1.0- 152.0	YES
Pentachlorophenol	79.44	79	14.0- 176.0	YES
Phenanthrene	88.96	89	54.0- 120.0	YES
Anthracene	89.44	89	27.0- 133.0	YES
Di-n-butylphthalate	98.70	99	1.0- 118.0	YES
Fluoranthene	101.20	101	26.0- 137.0	YES
Benzidine	319.00	64	1.0- 155.0	YES
Pyrene	85.98	86	52.0- 115.0	YES
Butylbenzylphthalate	94.12	94	1.0- 152.0	YES
3,3'-Dichlorobenzidine	91.48	91	1.0- 262.0	YES
Benzo(a)anthracene	91.01	91	33.0- 143.0	YES
bis(2-Ethylhexyl)phthalate	95.20	95	8.0- 158.0	YES
Chrysene	92.76	93	17.0- 168.0	YES
Di-n-octylphthalate	95.22	95	4.0- 146.0	YES
Benzo(b)fluoranthene	92.11	92	24.0- 159.0	YES
Benzo(k)fluoranthene	92.30	92	11.0- 163.0	YES
Benzo(a)pyrene	86.47	86	17.0- 163.0	YES
Indeno(1,2,3-cd)pyrene	87.25	87	1.0- 171.0	YES
Dibenz(a,h)anthracene	87.06	87	1.0- 227.0	YES
Benzo(g,h,i)perylene	84.92	85	1.0- 219.0	YES

COMMENTS: \_\_\_\_\_

## WATER SEMIVOLATILE LABORATORY CONTROL/LABORATORY CONTROL DUPLICATE SAMPLE RECOVERY

Lab Name: LANCASTER LABS

Lab Code: LANCAS

Instrument: HP03301

SW846 METHOD 8270

SPIKE LEVEL: 100 UG/ML

AMT USED: 1000.

SAMPLE SPIKE LEVEL: 100.UG/L % MOISTURE 0. DILUTION: 1

LCS SAMPLE: 171WALCS 171WALCS

LCSD SAMPLE: 171WALCSD 171WALCSD

COMPOUND NAME	LCS CONC UG/L	LCSD CONC UG/L	LCS REC %	LCSD REC %	RANGE LOWER-UPPER	IN SPEC	RPD %	RPD MAX	RPD IN SPEC
N-Nitrosodimethylamine	68.92	67.34	69	67	35.0-100.8	YES	2.00	30.0	YES
Phenol	48.72	48.17	49	48	5.0-112.0	YES	1.00	30.0	YES
b·s(2-Chloroethyl)ether	94.39	92.54	94	92	12.0-158.0	YES	2.00	30.0	YES
2-Chlorophenol	92.50	92.00	92	92	23.0-134.0	YES	1.00	30.0	YES
1,3-Dichlorobenzene	85.86	83.63	86	84	1.0-172.0	YES	3.00	30.0	YES
1,4-Dichlorobenzene	88.26	85.65	88	86	20.0-124.0	YES	3.00	30.0	YES
1,2-Dichlorobenzene	91.46	90.83	91	91	32.0-129.0	YES	1.00	30.0	YES
bis(2-Chloroisopropyl)ether	101.78	103.45	102	103	36.0-166.0	YES	-2.00	30.0	YES
N-Nitroso-di-n-propylamine	110.79	113.39	111	113	1.0-230.0	YES	-2.00	30.0	YES
Hexachloroethane	74.98	77.08	75	77	40.0-113.0	YES	-3.00	30.0	YES
Nitrobenzene	99.22	103.20	99	103	35.0-180.0	YES	-4.00	30.0	YES
Iscophorone	92.80	95.98	93	96	21.0-196.0	YES	-3.00	30.0	YES
2-Nitrophenol	91.79	97.94	92	98	29.0-182.0	YES	-6.00	30.0	YES
2,4-Dimethylphenol	80.92	83.22	81	83	32.0-119.0	YES	-3.00	30.0	YES
bis(2-Chloroethoxy)methane	90.28	91.85	90	92	33.0-184.0	YES	-2.00	30.0	YES
2,4-Dichlorophenol	93.31	95.20	93	95	39.0-135.0	YES	-2.00	30.0	YES
1,2,4-Trichlorobenzene	84.99	85.82	85	86	44.0-142.0	YES	-1.00	30.0	YES
Naphthalene	88.58	89.05	88	89	21.0-133.0	YES	-1.00	30.0	YES
Hexachlorobutadiene	71.61	73.95	72	74	24.0-116.0	YES	-3.00	30.0	YES
4-Chloro-3-methylphenol	96.46	97.65	96	98	22.0-147.0	YES	-1.00	30.0	YES
Hexachlorocyclopentadiene	115.53	117.21	58	59	1.0-100.0	YES	-1.00	30.0	YES
2,4,6-Trichlorophenol	93.96	95.71	94	96	37.0-144.0	YES	-2.00	30.0	YES
2-Chloronaphthalene	88.09	87.54	88	88	60.0-118.0	YES	1.00	30.0	YES
Dimethylphthalate	86.59	82.05	86	82	1.0-112.0	YES	5.00	30.0	YES
2,6-Dinitrotoluene	87.41	88.29	87	88	50.0-158.0	YES	-1.00	30.0	YES
Acenaphthylene	87.90	88.61	88	89	33.0-145.0	YES	-1.00	30.0	YES
Acenaphthene	87.91	89.00	88	89	47.0-145.0	YES	-1.00	30.0	YES
2,4-Dinitrophenol	99.86	99.50	100	99	1.0-191.0	YES	0.00	30.0	YES
4-Nitrophenol	47.64	47.72	48	48	1.0-132.0	YES	0.00	30.0	YES
2,4-Dinitrotoluene	104.96	104.01	105	104	39.0-139.0	YES	1.00	30.0	YES
1-Naphthylamine	40.76	40.49	41	40	1.0-100.0	YES	1.00	30.0	YES
2-Naphthylamine	52.41	52.32	52	52	1.0-100.0	YES	0.00	30.0	YES
Diethylphthalate	96.64	94.19	97	94	1.0-114.0	YES	3.00	30.0	YES
4-Chlorophenyl-phenylether	91.82	89.00	92	89	25.0-158.0	YES	3.00	30.0	YES
Fluorene	91.73	89.46	92	89	59.0-121.0	YES	3.00	30.0	YES
4,6-Dinitro-2-methylphenol	88.46	91.66	88	92	1.0-181.0	YES	-4.00	30.0	YES
N-Nitrosodiphenylamine	82.97	85.90	83	86	37.8-147.0	YES	-3.00	30.0	YES
1,2-Diphenylhydrazine	87.54	91.10	88	91	25.7-124.9	YES	-4.00	30.0	YES
4-Bromophenyl-phenylether	92.08	93.00	92	93	53.0-127.0	YES	-1.00	30.0	YES

## WATER SEMIVOLATILE LABORATORY CONTROL/LABORATORY CONTROL DUPLICATE SAMPLE RECOVERY

Lab Name: LANCASTER LABS

Lab Code: LANCAS

Instrument: HP03301

SW846 METHOD 8270

SPIKE LEVEL: 100 UG/ML

AMT USED: 1000.

SAMPLE SPIKE LEVEL: 100.UG/L % MOISTURE 0. DILUTION: 1

LCS SAMPLE: 171WALCS 171WALCS

LCSD SAMPLE: 171WALCSD 171WALCSD

COMPOUND NAME	LCS CONC UG/L	LCSD CONC UG/L	LCS REC %	LCSD REC %	RANGE LOWER-UPPER	IN SPEC	RPD %	RPD MAX	RPD IN SPEC
Hexachlorobenzene	94.46	94.31	94	94	1.0-152.0	YES	0.00	30.0	YES
Pentachlorophenol	79.44	75.58	79	76	14.0-176.0	YES	5.00	30.0	YES
Phenanthrene	88.96	89.45	89	89	54.0-120.0	YES	-1.00	30.0	YES
Anthracene	89.44	88.62	89	89	27.0-133.0	YES	1.00	30.0	YES
Di-n-butylphthalate	98.70	95.42	99	95	1.0-118.0	YES	3.00	30.0	YES
Fluoranthene	101.20	95.34	101	95	26.0-137.0	YES	6.00	30.0	YES
Benzidine	319.00	361.12	64	72	1.0-155.0	YES	-12.00	30.0	YES
Pyrene	85.98	89.75	86	90	52.0-115.0	YES	-4.00	30.0	YES
Butylbenzylphthalate	94.12	93.46	94	93	1.0-152.0	YES	1.00	30.0	YES
3,3'-Dichlorobenzidine	91.48	92.89	91	93	1.0-262.0	YES	-2.00	30.0	YES
Benzo(a)anthracene	91.01	89.61	91	90	33.0-143.0	YES	2.00	30.0	YES
bis(2-Ethylhexyl)phthalate	95.20	95.00	95	95	8.0-158.0	YES	0.00	30.0	YES
Chrysene	92.76	90.72	93	91	17.0-168.0	YES	2.00	30.0	YES
Di-n-octylphthalate	95.22	96.92	95	97	4.0-146.0	YES	-2.00	30.0	YES
Benzo(b)fluoranthene	92.11	91.07	92	91	24.0-159.0	YES	1.00	30.0	YES
Benzo(k)fluoranthene	92.30	92.67	92	93	11.0-163.0	YES	0.00	30.0	YES
Benzo(a)pyrene	86.47	86.77	86	87	17.0-163.0	YES	0.00	30.0	YES
Indeno(1,2,3-cd)pyrene	87.25	88.82	87	89	1.0-171.0	YES	-2.00	30.0	YES
Dibenz(a,h)anthracene	87.06	88.33	87	88	1.0-227.0	YES	-1.00	30.0	YES
Benzo(g,h,i)perylene	84.92	86.97	85	87	1.0-219.0	YES	-2.00	30.0	YES

COMMENTS: \_\_\_\_\_

8B  
SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: LANCASTER LABS Contract: \_\_\_\_\_  
 Lab Code: LANCAS Case No.: \_\_\_\_\_. SAS No.: \_\_\_\_\_. SDG No.: \_\_\_\_\_.  
 Lab File ID (Standard): >Z7301 Date Analyzed: 07/05/95  
 Instrument ID: HP02550 Time Analyzed: 16:08

	IS1(DCB) AREA #	RT	IS2(NPT) AREA #	RT	IS3(ANT) AREA #	RT
12 HOUR STD	41975	11.65	146677	15.00	76661	19.81
UPPER LIMIT	83950	12.15	293354	15.50	153322	20.31
LOWER LIMIT	20988	11.15	73339	14.50	38331	19.31
EPA SAMPLE NO.						
01	0303BMSD	11.66	147781	15.01	77687	19.81
02	0400B	11.67	148989	15.01	77461	19.81
03	0303BMS	11.67	147450	15.01	79313	19.81
04	0405B	11.66	137070	15.01	73874	19.81
05						
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22						

IS1 (DCB) = 1,4-Dichlorobenzene-d4

IS2 (NPT) = Naphthalene-d8

IS3 (ANT) = Acenaphthene-d10

AREA UPPER LIMIT = +100% of internal standard area

AREA LOWER LIMIT = - 50% of internal standard area

RT UPPER LIMIT = +0.50 minutes of internal standard RT

RT LOWER LIMIT = -0.50 minutes of internal standard RT

# Column used to flag internal standard area values with an asterisk.  
 \* Values outside of QC limits.

8C  
SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: LANCASTER LABS

Contract: \_\_\_\_\_

Lab Code: LANCAS Case No.: \_\_\_\_\_

SAS No.: \_\_\_\_\_. SDG No.: \_\_\_\_\_.

Lab File ID (Standard): >Z7301

Date Analyzed: 07/05/95

Instrument ID: HP02550

Time Analyzed: 16:08

	IS4(PHN) AREA #	RT	IS5(CRY) AREA #	RT	IS6(PRY) AREA #	RT
12 HOUR STD	113834	23.91	104503	30.73	48838	35.61
UPPER LIMIT	227668	24.41	209006	31.23	97676	36.11
LOWER LIMIT	56917	23.41	52252	30.23	24419	35.11
EPA SAMPLE NO.						
01 0303BMSD	119527	23.93	68256	30.71	28576	35.62
02 0400B	120999	23.92	72241	30.71	27091	35.61
03 0303BMS	122200	23.93	71578	30.72	26418	35.62
04 0405B	109187	23.93	56771	30.72	25260	35.63
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IS4 (PHN) = Phenanthrene-d10

IS5 (CRY) = Chrysene-d12

IS6 (PRY) = Perylene-d12

AREA UPPER LIMIT = +100% of internal standard area

AREA LOWER LIMIT = - 50% of internal standard area

RT UPPER LIMIT = +0.50 minutes of internal standard RT

RT LOWER LIMIT = -0.50 minutes of internal standard RT

# Column used to flag internal standard area values with an asterisk.  
\* Values outside of QC limits.

## SEMOVOLATILE ORGANICS INITIAL CALIBRATION DATA

Lab Name: LANCASTER LABS

Contract: \_\_\_\_\_

Lab Code: LANCAS Case No.: \_\_\_\_\_.SAS No.: \_\_\_\_\_. SDG No.: \_\_\_\_\_.  
Instrument ID: HP03189 Calibration Date(s): 06/27/95 06/28/95

Min RRF for SPCC(#) = 0.050

Max %RSD for CCC(\*) = 30.0%

LAB FILE ID:	RRF5 =>V6255	RRF50 =>V6253	RRF80 =>V6254	RRF120=>V6252	RRF160=>V6251	RRF	X	CAL.	RSD	METHOD
Pyridine	2.209	2.342	2.408	2.388	2.237	2.317	3.9	AVG		
N-Nitrosodimethylamine	1.364	1.415	1.410	1.407	1.337	1.387	2.5	AVG		
2-Picoline	1.926	2.008	2.036	2.130	2.058	2.032	3.7	AVG		
Phenol	* 2.829	2.495	2.447	2.372	2.184	2.465	9.5	AVG	*	
Aniline	3.094	2.723	2.510	2.507	2.377	2.642	10.7	AVG		
bis(2-Chloroethyl)ether	1.993	1.711	1.645	1.508	1.364	1.644	14.4	AVG		
2-Chlorophenol	2.142	2.017	1.983	1.899	1.722	1.953	8.0	AVG		
1,3-Dichlorobenzene	2.598	2.319	2.291	2.140	1.982	2.266	10.1	AVG		
1,4-Dichlorobenzene	* 2.597	2.332	2.315	2.141	1.987	2.274	10.1	AVG	*	
Benzyl alcohol	1.026	1.024	1.034	1.011	.964	1.012	2.7	AVG		
1,2-Dichlorobenzene	2.410	2.017	1.933	1.749	1.546	1.931	16.7	2NDDEG		
2-Methylphenol	1.710	1.633	1.661	1.621	1.546	1.634	3.7	AVG		
2,2'-oxybis(1-Chloropropane)	4.554	4.381	4.436	4.318	3.919	4.322	5.6	AVG		
bis(2-Chloroisopropyl)ether	4.554	4.381	4.436	4.318	3.919	4.322	5.6	AVG		
4-Methylphenol	2.047	1.659	1.515	1.329	1.176	1.545	21.7	2NDDEG		
3 or 4-Methylphenol	2.047	1.659	1.515	1.329	1.176	1.545	21.7	2NDDEG		
Acetophenone	6.825	5.536	5.590	5.364	4.908	5.645	12.6	AVG		
N-Nitroso-di-n-propylamine	# 1.652	1.502	1.466	1.243	.922	1.357	20.9	2NDDEG	#	
o-Toluidine	4.277	3.462	3.154	3.247	2.841	3.396	15.9	2NDDEG		
Hexachloroethane	.982	.991	1.008	.971	.878	.966	5.3	AVG		
Nitrobenzene	.629	.672	.677	.677	.637	.658	3.6	AVG		
Iscphorone	1.110	1.151	1.177	1.205	1.177	1.164	3.1	AVG		
2-Nitrophenol	* .251	.336	.335	.347	.327	.319	12.2	AVG	*	
2,4-Dimethylphenol	.594	.599	.603	.455	.581	.566	11.1	AVG		
Benzoic acid	.313	.367	.418	.454	.455	.401	15.2	2NDDEG		
bis(2-Chloroethoxy)methane	.703	.669	.671	.685	.657	.677	2.6	AVG		
2,4-Dichlorophenol	* .488	.501	.494	.489	.466	.488	2.7	AVG	*	
1,2,4-Trichlorobenzene	.582	.575	.561	.553	.509	.556	5.2	AVG		
Naphthalene	1.631	1.540	1.540	1.457	1.320	1.498	7.8	AVG		
4-Chloroaniline	.703	.692	.704	.688	.644	.686	3.6	AVG		
Hexachlorobutadiene	* .378	.376	.377	.380	.328	.368	6.1	AVG	*	
4-Chloro-3-methylphenol	* .454	.517	.536	.516	.470	.499	7.0	AVG	*	
2-Methylnaphthalene	1.056	.971	.979	.916	.842	.953	8.3	AVG		
Hexachlorocyclopentadiene	# .473	.717	.808	.896	.877	.754	22.8	2NDDEG	#	
2,4,6-Trichlorophenol	* .646	.710	.764	.805	.814	.748	9.4	AVG	*	
2,4,5-Trichlorophenol	.688	.768	.806	.832	.800	.779	7.2	AVG		
2-Chloronaphthalene	2.025	1.878	1.968	1.986	1.928	1.957	2.9	AVG		
2-Nitroaniline	.587	.810	.886	.918	.917	.824	16.9	2NDDEG		

6C  
SEMOVOLATILE ORGANICS INITIAL CALIBRATION DATA

Lab Name: LANCASTER LABS Contract: \_\_\_\_\_

Lab Code: LANCAS Case No.: \_\_\_\_\_.SAS No.: \_\_\_\_\_. SDG No.: \_\_\_\_\_

Instrument ID: HP03189 Calibration Date(s): 06/27/95 06/28/95

Min RRF for SPCC(#) = 0.050

Max %RSD for CCC(\*) = 30.0%

LAB FILE ID:	RRF5 = >V6255	RRF50 = >V6253						
	RRF80 = >V6254	RRF120= >V6252 -	RRF160= >V6251					
COMPOUND	RRF5	RRF50	RRF80	RRF120	RRF160	RRF	%	CAL.
Dimethylphthalate	2.261	2.254	2.330	2.273	2.270	2.278	1.3	AVG
2,6-Dinitrotoluene	.349	.519	.539	.518	.501	.485	15.9	2NDDEG
Acenaphthylene	3.176	3.027	3.096	3.021	2.837	3.032	4.1	AVG
3-Nitroaniline	.430	.579	.588	.575	.580	.550	12.2	AVG
Acenaphthene	* 2.043	1.911	1.934	1.941	1.836	1.933	3.8	AVG *
2,4-Dinitrophenol	# .200	.255	.319	.342	.350	.293	21.9	2NDDEG #
4-Nitrophenol	# .247	.330	.356	.329	.305	.313	13.1	AVG #
Dibenzofuran	2.965	2.634	2.573	2.472	2.302	2.589	9.5	AVG
2,4-Dinitrotoluene	.639	.727	.764	.724	.728	.717	6.5	AVG
1-Naphthylamine	2.389	2.081	2.245	2.219	2.082	2.203	5.8	AVG
2-Naphthylamine	1.992	1.750	1.926	1.933	1.867	1.893	4.8	AVG
Diethylphthalate	2.257	2.214	2.285	2.202	2.121	2.216	2.8	AVG
4-Chlorophenyl-phenylether	1.116	1.055	1.095	1.046	1.015	1.065	3.8	AVG
Fluorene	2.127	2.066	2.034	1.971	1.854	2.011	5.2	AVG
4-Nitroaniline	.340	.523	.559	.551	.558	.506	18.6	1STDEG
4,6-Dinitro-2-methylphenol	.164	.228	.243	.230	.214	.216	14.3	AVG
H-Nitrosodiphenylamine (1)	* .913	.878	.901	.884	.826	.880	3.8	AVG *
1,2-Diphenylhydrazine	1.615	1.564	1.623	1.628	1.530	1.592	2.7	AVG
4-Bromophenyl-phenylether	.427	.431	.461	.448	.405	.434	4.9	AVG
Hexachlorobenzene	.622	.598	.606	.596	.536	.592	5.5	AVG
Pentachlorophenol	* .285	.301	.333	.340	.321	.316	7.1	2NDDEG *
Phenanthrone	2.084	1.809	1.839	1.727	1.550	1.802	10.7	AVG
Anthracene	1.974	1.888	1.843	1.768	1.630	1.821	7.1	AVG
Carbazole	1.611	1.704	1.696	1.598	1.453	1.612	6.3	AVG
Di-n-butylphthalate	1.789	2.216	2.170	2.113	1.865	2.031	9.4	AVG
Fluoranthene	* 1.773	1.992	1.869	1.749	1.467	1.770	11.0	AVG *
Benzidine	1.272	1.031	1.100	1.092	1.058	1.111	8.5	AVG
Pyrene	2.420	2.464	3.044	3.047	2.917	2.779	11.2	AVG
Butylbenzylphthalate	.725	1.077	1.132	1.102	1.085	1.024	16.5	1STDEG
3,3'-Dichlorobenzidine	.527	.638	.732	.774	.820	.698	16.7	1STDEG
Benzo(a)anthracene	1.751	1.797	1.845	1.953	1.956	1.861	4.9	AVG
bis(2-Ethylhexyl)phthalate	1.073	1.442	1.470	1.452	1.445	1.376	12.4	AVG
Chrysene	1.782	1.738	1.798	1.880	1.888	1.817	3.6	AVG
Di-n-octylphthalate	* 2.921	3.449	3.004	3.320	3.296	3.198	7.0	2NDDEG *
7,12-Dimethylbenz[a]anthracene	1.302	1.273	1.261	1.359	1.288	1.297	3.0	AVG
Benzo(b)fluoranthene	2.863	2.440	2.659	2.620	2.739	2.664	5.9	AVG
Benzo(k)fluoranthene	2.657	2.473	2.469	2.609	2.304	2.502	5.5	AVG

(1) Cannot be separated from Diphenylamine

6C Cont.  
SEMOVOLATILE ORGANICS INITIAL CALIBRATION DATA

Lab Name: LANCASTER LABS

Contract: \_\_\_\_\_

Lab Code: LANCAS Case No.: \_\_\_\_\_.SAS No.: \_\_\_\_\_. SDG No.: \_\_\_\_\_.

Instrument ID: HP03189 Calibration Date(s): 06/27/95 06/28/95

Min RRF for SPCC(#) = 0.050

Max %RSD for CCC(\*) = 30.0%

LAB FILE ID:	RRF5 = >V6255	RRF50 = >V6253	RRF80 = >V6254	RRF120= >V6252	RRF160= >V6251	RRF	% RSD	CAL. METHOD
COMPOUND	RRF5	RRF50	RRF80	RRF120	RRF160	RRF		
Benz(a)pyrene	* 2.221	2.245	2.371	2.380	2.215	2.286	3.6	AVG *
Indeno(1,2,3-cd)pyrene	1.379	1.900	1.747	1.782	1.630	1.687	11.7	AVG
Benzo(a,h)anthracene	1.399	1.881	1.686	1.749	1.631	1.669	10.6	AVG
Benzo(g,h,i)perylene	1.290	1.854	1.643	1.669	1.530	1.597	13.0	AVG
2-Fluorophenol	1.820	1.850	1.874	1.832	1.734	1.822	2.9	AVG
Phenol-d5	2.400	2.227	2.123	2.048	1.895	2.139	8.9	AVG
Phenol-d6	2.400	2.227	2.123	2.048	1.895	2.139	8.9	AVG
Nitrobenzene-d5	.572	.634	.655	.672	.638	.634	6.0	AVG
2-Fluorobiphenyl	2.316	2.138	2.205	2.181	2.162	2.200	3.2	AVG
2,4,6-Tribromophenol	.435	.518	.586	.553	.524	.523	10.8	AVG
Terphenyl-d14	1.380	1.658	1.996	1.897	1.808	1.748	13.7	AVG

FORM VI SV-1

1/87 Rev.

4,6-Dinitro-2-methylphenol and 4-Nitrophenol are at 10 ng/uL in the 5 standard.

2,4-Dinitrophenol and 2 or 4-Chloronitrobenzene levels are 40 and 100 ng/uL respectively in the 5 standard.

Benzoic acid and Pentachlorophenol are at 20 ng/uL in the 5 standard.

Benzidine levels in the 5,50,80,120,160 standards are 95,200,320,480 and 640 ng/uL respectively.

**Initial Calibration Data**  
**HSL Compounds**

Case No:

Instrument ID: HP03189

Contractor: LANCASTER LABS

Calibration Date: 06/28/95

Contract No:

Minimum RF for SPCC is 0.05      Maximum % RSD for CCC is 30.0%

Compound	Laboratory ID:	>V6255	>V6253	>V6254	>V6252	>V6251	RF	RF	RF	RF	RF	RRT	RF	% RSD	CORR1	CORR2	CCC	SPCC
		5.00	50.00	80.00	120.00	160.00												
Pyridine		1.38088	1.46399	1.50487	1.49281	1.39794	.259	1.44810	3.862	.998279	.999317							
2-Picoline		1.20375	1.25487	1.27265	1.33115	1.28612	.463	1.26971	3.657	.999470	.999473							
N-Nitrosodimethylamine		.85223	.88437	.88145	.87966	.83543	.256	.86663	2.505	.999003	.999694							
3-Chloropropionitrile		-	-	-	-	-	-	-	-	-	-							
Methyl methanesulfonate		-	-	-	-	-	-	-	-	-	-							
Phenol		1.76798	1.55918	1.52924	1.48261	1.36499	.912	1.54080	9.537	.996933	.999390	*						
Aniline		1.93389	1.70183	1.56847	1.56675	1.48548	.907	1.65128	10.659	.998645	.999650							
bis(2-Chloroethyl)ether		1.24564	1.06949	1.02811	.94230	.85281	.934	1.02767	14.361	.992803	.999484							
2-Chlorophenol		1.33872	1.26047	1.23940	1.18673	1.07652	.939	1.22037	7.966	.995277	.999092							
1,3-Dichlorobenzene		1.62398	1.44936	1.43212	1.33748	1.23856	.982	1.41630	10.127	.995980	.999667							
1,4-Dichlorobenzene		1.62289	1.45768	1.44714	1.33786	1.24186	1.005	1.42148	10.059	.995689	.999672	*						
Benzyl alcohol		.64116	.63989	.64618	.63211	.60274	1.049	.63242	2.742	.998922	.999794							
1,2-Dichlorobenzene		1.50654	1.26080	1.20831	1.09342	.96645	1.047	1.20710	16.743	.989268	.998784							
2-Methylphenol		1.06906	1.02068	1.03824	1.01341	.96625	1.089	1.02153	3.682	.998915	.999754							
2,2'-oxybis(1-Chloropropane)		2.84608	2.73835	2.77272	2.69897	2.44925	1.093	2.70107	5.583	.995947	.998684							
bis(2-Chloroisopropyl)ether		2.84608	2.73835	2.77272	2.69897	2.44925	1.093	2.70107	5.583	.995947	.998684							
4-Methylphenol		1.27931	1.03681	.94716	.83044	.73515	1.135	.96577	21.670	.985430	.999485							
3 or 4-Methylphenol		1.27931	1.03681	.94716	.83044	.73515	1.135	.96577	21.670	.985430	.999485							
N-Methylaniline		-	-	-	-	-	-	-	-	-	-							
Acetophenone		4.26555	3.45993	3.49401	3.35231	3.06730	1.127	3.52782	12.620	.996392	.999046							
N-Nitroso-di-n-propylamine		1.03265	.93870	.91620	.77714	.57599	1.132	.84813	20.925	.940946	.961451	**						
o-Toluidine		2.67333	2.16375	1.97112	2.02910	1.77576	1.136	2.12261	15.924	.993679	.996437							
Hexachloroethane		.61351	.61966	.62997	.60694	.54893	1.147	.60380	5.271	.995270	.998633							
2-Fluorophenol		1.13750	1.15613	1.17156	1.14477	1.08383	.636	1.13876	2.923	.998591	.999696							
Phenol-d5		1.50024	1.39209	1.32710	1.28028	1.18458	.908	1.33686	8.869	.996816	.999674							
Phenol-d6		1.50024	1.39209	1.32710	1.28028	1.18458	.908	1.33686	8.869	.996816	.999674							
Nitrobenzene		.39301	.41991	.42313	.42316	.39824	.849	.41149	3.562	.998634	.999481							
N,N-Dimethylaniline		-	-	-	-	-	-	-	-	-	-							

RF - Response Factor (Subscript is amount in ng/ $\mu$ l)

RRT - Average Relative Retention Time (RT Std/RT Istd)

RF - Average Response Factor

%RSD - Percent Relative Standard Deviation

CORRn - Coefficient of Correlation (nth degree)

CCC - Calibration Check Compounds (\*)    SPCC - System Performance Check Compounds (\*\*)    Form VI    Page 1 of 4

JLE 6/28/95

Initial Calibration Data  
HSL Compounds

Case No: \_\_\_\_\_  
 Contractor: LANCASTER LABS \_\_\_\_\_  
 Contract No: \_\_\_\_\_

Instrument ID: HP03189

Calibration Date: 06/28/95

Minimum RF for SPCC is 0.05      Maximum % RSD for CCC is 30.0%

Laboratory ID: >V6255 >V6253 >V6254 >V6252 >V6251

Compound	RF 5.00	RF 50.00	RF 80.00	RF 120.00	RF 160.00	RRT	RF	% RSD	CORR1	CORR2	CCC SPCC
Isophorone	.69355	.71911	.73588	.75335	.73587	.904	.72755	3.098	.999757	.999765	
2-Nitrophenol	.15673	.20999	.20927	.21659	.20464	.918	.19944	12.161	.998905	.999289	*
2,4-Dimethylphenol	.37144	.37436	.37659	.28416	.36312	.937	.35394	11.115	.979572	.982405	
Benzoic acid	.19591	.22950	.26096	.28403	.28418	.973	.25092	15.160	.999208	.999308	
bis(2-Chloroethoxy)methane	.43929	.41809	.41920	.42831	.41085	.959	.42315	2.588	.999465	.999608	(Cconc=20.
1-Methyl-2-nitrobenzene	-	-	-	-	-	-	-	-	-	-	
2,4-Dichlorophenol	.30512	.31282	.30862	.30573	.29118	.973	.30469	2.672	.999009	.999810	*
1,2,4-Trichlorobenzene	.36356	.35911	.35050	.34562	.31790	.990	.34734	5.153	.997118	.999248	
1,3-Dimethyl-2-nitrobenzene	-	-	-	-	-	-	-	-	-	-	
Naphthalene	1.01932	.96255	.96279	.91047	.82497	1.005	.93602	7.804	.994744	.998998	
1-Methyl-3-nitrobenzene	-	-	-	-	-	-	-	-	-	-	
4-Chloroaniline	.43967	.43258	.44031	.43007	.40257	1.023	.42904	3.601	.998054	.999471	
Hexachlorobutadiene	.23605	.23527	.23559	.23738	.20494	1.038	.22985	6.067	.992078	.995408	*
1-Methyl-4-nitrobenzene	-	-	-	-	-	-	-	-	-	-	
2 or 4-Chloronitrobenzene	-	-	-	-	-	-	-	-	-	-	
2-Tertbutylphenol	-	-	-	-	-	-	-	-	-	-	
1,4-Dimethyl-2-nitrobenzene	-	-	-	-	-	-	-	-	-	-	
4-Chloro-3-methylphenol	.28401	.32316	.33489	.32269	.29348	1.140	.31165	6.972	.995592	.998662	*
3 or 4-Tertbutylphenol	-	-	-	-	-	-	-	-	-	-	
2-Methylnaphthalene	.65989	.60717	.61176	.57262	.52622	1.164	.59553	8.341	.995542	.999353	
Nitrobenzene-d5	.35737	.39655	.40945	.41992	.39875	.845	.39641	5.986	.999063	.999292	
Hexachlorocyclopentadiene	.29573	.44824	.50519	.56009	.54839	.858	.47153	22.824	.997953	.998449	**
2,4,5-Trichlorophenol	.40358	.44376	.47732	.50322	.50866	.879	.46731	9.399	.999136	.999692	*
2,4,5-Trichlorophenol	.42992	.48022	.50371	.52018	.49977	.884	.48676	7.152	.999308	.999354	
2-Chloronaphthalene	1.26531	1.17375	1.23027	1.24134	1.20491	.910	1.22312	2.871	.999578	.999626	
1,2-Dichloro-4-nitrobenzene	-	-	-	-	-	-	-	-	-	-	
1,2-Dichloro-3-nitrobenzene	-	-	-	-	-	-	-	-	-	-	
2,6-Ditertbutylphenol	-	-	-	-	-	-	-	-	-	-	

RF - Response Factor (Subscript is amount in ng/ $\mu$ l)

RRT - Average Relative Retention Time (RT Std/RT Istd)

RF - Average Response Factor

%RSD - Percent Relative Standard Deviation

CORRn - Coefficient of Correlation (nth degree)

CCC - Calibration Check Compounds (\*)    SPCC - System Performance Check Compounds (\*\*)

Initial Calibration Data  
HSL Compounds

Case No: ----- Instrument ID: HP03189  
 Contractor: LANCASTER LABS Calibration Date: 06/28/95  
 Contract No: -----

Minimum RF for SPCC is 0.05      Maximum % RSD for CCC is 30.0%

Compound	Laboratory ID: >V6255 >V6253 >V6254 >V6252 >V6251					<u>RRT</u>	<u>RF</u>	% RSD	CORR1	CORR2	CCC	SPCC
	RF 5.00	RF 50.00	RF 80.00	RF 120.00	RF 160.00							
2-Nitroaniline	.36685	.50597	.55398	.57376	.57317	.930	.51475	16.932	.999486	.999623		
1,4-Naphthoquinone	-	-	-	-	-							
Dimethylphthalate	1.41281	1.40877	1.45645	1.42087	1.41882	.966	1.42355	1.335	.999865	.999901		
3,4-Dichloro-nitrobenzene	-	-	-	-	-							
Acenaphthylene	1.98511	1.89204	1.93526	1.88824	1.77331	.976	1.89479	4.139	.998229	.999494		
2,4-Ditertbutylphenol	-	-	-	-	-							
2,6-Dinitrotoluene	.21818	.32428	.33713	.32363	.31307	.974	.30326	15.933	.998817	.999823		
3-Nitroaniline	.26895	.36198	.36733	.35939	.36245	.999	.34402	12.226	.999889	.999920		
3,4-Dichloroaniline	-	-	-	-	-							
Acenaphthene	1.27673	1.19417	1.20874	1.21317	1.14745	1.006	1.20805	3.840	.998950	.999486	*	
BHT	-	-	-	-	-							
2,4-Dinitrophenol	.12489	.15954	.19965	.21350	.21893	1.017	.18330	21.865	.999458	.999958	**	(Conc=40.
4-Nitrophenol	.15438	.20623	.22222	.20557	.19043	1.033	.19577	13.140	.994540	.998997	**	(Conc=10.
3,5-Ditertbutylphenol	-	-	-	-	-							
Dibenzofuran	1.85327	1.64651	1.60817	1.54503	1.43890	1.035	1.61838	9.455	.997369	.999712		
2,4-Dinitrotoluene	.39948	.45413	.47774	.45246	.45529	1.039	.44782	6.461	.999474	.999619		
1-Naphthylamine	1.49330	1.30071	1.40330	1.38668	1.30136	1.049	1.37707	5.838	.998181	.998845		
2-Naphthylamine	1.24483	1.09370	1.20360	1.20807	1.16657	1.062	1.18335	4.840	.999073	.999124		
Diethylphthalate	1.41047	1.38369	1.42813	1.37648	1.32566	1.085	1.38489	2.821	.999016	.999784		
4-Chlorophenyl-phenylether	.69726	.65907	.68413	.65391	.63413	1.096	.66570	3.767	.999086	.999766		
Fluorene	1.32926	1.29133	1.27131	1.23203	1.15895	1.091	1.25658	5.164	.998082	.999787		
4-Nitroaniline	.21247	.32706	.34919	.34412	.34904	1.100	.31638	18.582	.999836	.999840		
2-Fluorobiphenyl	1.44779	1.33640	1.37809	1.36288	1.35114	.895	1.37526	3.151	.999903	.999920		
2,4,6-Tribromophenol	.27188	.32388	.36653	.34569	.32748	1.130	.32709	10.766	.997152	.998619		
4,6-Dinitro-2-methylphenol	.10236	.14261	.15181	.14347	.13361	.889	.13477	14.267	.995876	.999298		(Conc=10.
N-Nitrosodiphenylamine	.57071	.54875	.56285	.55248	.51625	.898	.55021	3.791	.998071	.999336	*	
1,2-Diphenylhydrazine	1.00912	.97774	1.01429	1.01739	.95595	.902	.99490	2.704	.998583	.999198		
1-Nitronaphthalene	-	-	-	-	-							

RF - Response Factor (Subscript is amount in ng/ $\mu$ l)

RRT - Average Relative Retention Time (RT Std/RT Istd)

RF - Average Response Factor

%RSD - Percent Relative Standard Deviation

CORRn - Coefficient of Correlation (nth degree)

CCC - Calibration Check Compounds (\*)    SPCC - System Performance Check Compounds (\*\*)

Initial Calibration Data  
HSL Compounds

Case No: \_\_\_\_\_  
 Contractor: LANCASTER LABS \_\_\_\_\_  
 Contract No: \_\_\_\_\_

Instrument ID: HP03189

Calibration Date: 06/28/95

Minimum RF for SPCC is 0.05      Maximum % RSD for CCC is 30.0%

Compound	Laboratory ID: >V6255 >V6253 >V6254 >V6252 >V6251					<u>RRT</u>	<u>RF</u>	% RSD	CORR1	CORR2	CCC	SPCC
	RF 5.00	RF 50.00	RF 80.00	RF 120.00	RF 160.00							
4-Methyl-3-nitrobenzoic acid	-	-	-	-	-	-	-	-	-	-	-	-
4-Bromophenyl-phenylether	.25716	.26914	.28797	.28002	.25326	.946	.27151	4.875	.995471	.997912	*	
Hexachlorobenzene	.38890	.37360	.37881	.37219	.33499	.949	.36970	5.540	.995545	.998231		
Pentachlorophenol	.17835	.18836	.20794	.21264	.20060	.977	.19758	7.150	.998091	.998821	*	(Conc=20.
Phenanthrene	1.30231	1.13074	1.14906	1.07919	.96863	1.003	1.12599	10.749	.993780	.998476		
Anthracene	1.23366	1.17976	1.15214	1.10502	1.01880	1.010	1.13787	7.139	.996521	.999554		
Carbazole	1.00677	1.06470	1.06005	.99880	.90799	1.035	1.00766	6.279	.994617	.999200		
Di-n-butylphthalate	1.11785	1.38509	1.35616	1.32072	1.16592	1.091	1.26915	9.424	.992858	.997819		
Diphenyl sulfone												
Fluoranthene	1.10814	1.24518	1.16830	1.09288	.91712	1.161	1.10632	10.987	.982971	.994920	*	
Benzidine	.79530	.64462	.68744	.68233	.66132	.878	.69420	8.506	.998910	.998932		(Conc=95.
Pyrene	1.51267	1.54018	1.90263	1.90440	1.82332	.881	1.73664	11.224	.997316	.997391		
Butylbenzylphthalate	.45305	.67294	.70737	.68846	.67829	.954	.64002	16.459	.999558	.999854		
3,3'-Dichlorobenzidine	.32924	.39869	.45773	.48361	.51241	1.001	.43634	16.749	.997334	.999560		
Berzo(a)anthracene	1.09443	1.12340	1.15327	1.22088	1.22224	.999	1.16284	4.945	.999403	.999756		
Chrysene	1.11392	1.08629	1.12381	1.17478	1.17991	1.003	1.13574	3.560	.999513	.999833		
bis(2-Ethylhexyl)phthalate	.67037	.90094	.91858	.90758	.90337	1.014	.86017	12.360	.999907	.999982		
Terphenyl-d14	.86274	1.03648	1.24725	1.18543	1.12976	.902	1.09233	13.725	.996937	.997799		
Di-n-octylphthalate	1.82533	2.15541	1.87757	2.07480	2.05971	.952	1.99856	7.023	.998195	.998346	*	
7,12-Dimethylbenz[a]anthracene	.81365	.79566	.78786	.84968	.80496	.973	.81036	2.964	.998711	.998713		
Berzo(b)fluoranthene	1.78963	1.52473	1.66213	1.63769	1.71180	.972	1.66520	5.865	.998972	.999625		
Berzo(k)fluoranthene	1.66053	1.54548	1.54306	1.63048	1.44016	.975	1.56394	5.524	.995044	.996068		
Berzo(a)pyrene	1.38819	1.40317	1.48194	1.48731	1.38459	.996	1.42904	3.587	.998038	.998808	*	
Inceno(1,2,3-cd)pyrene	.86170	1.18761	1.09197	1.11352	1.01853	1.087	1.05466	11.716	.996458	.998741		
Dibenzo(a,h)anthracene	.87427	1.17539	1.05383	1.09305	1.01953	1.091	1.04321	10.628	.997517	.998805		
Berzo(g,h,i)perylene	.80602	1.15883	1.02677	1.04306	.95595	1.113	.99813	13.000	.995775	.998692		

RF - Response Factor (Subscript 1 is amount in ng/ $\mu$ l)

RRT - Average Relative Retention Time (RT Std/RT Istd)

RF - Average Response Factor

%RSD - Percent Relative Standard Deviation

CORRn - Coefficient of Correlation (nth degree)

CCC - Calibration Check Compounds (\*)      SPCC - System Performance Check Compounds (\*\*)

7B  
SEMIVOLATILE CONTINUING CALIBRATION CHECK

Lab Name: LANCASTER LABS

Contract: \_\_\_\_\_

Lab Code: LANCAS Case No.: \_\_\_\_\_. SAS No.: \_\_\_\_\_. SDG No.: \_\_\_\_\_.

Instrument ID: HP03189 Calibration Date: 06/28/95 Time: 13:03

Lab File ID: >V6303

Init. Calib. Date(s): 06/27/95 06/28/95

Min RRF50 for SPCC(#) = 0.050

Max %Drift for CCC(\*) = 20.7

COMPOUND	RRF	RRF80	ACTUAL CONC	TRUE CONC	% DRIFT
Pyridine	2.317	1.488	82.20	80.0	-2.8
N-Nitrosodimethylamine	1.387	.878	81.02	80.0	-1.3
2-Picoline	2.032	1.292	81.41	80.0	-1.8
Phenol	* 2.465	1.514	78.60	80.0	1.8*
Aniline	2.642	1.580	76.53	80.0	4.3
bis(2-Chloroethyl)ether	1.644	.969	75.43	80.0	5.7
2-Chlorophenol	1.953	1.238	81.18	80.0	-1.5
1,3-Dichlorobenzene	2.266	1.408	79.53	80.0	.6
1,4-Dichlorobenzene	* 2.274	1.404	78.99	80.0	1.3*
Benzyl alcohol	1.012	.635	80.30	80.0	-.4
1,2-Dichlorobenzene	1.931	1.153	76.10	80.0	4.9
2-Methylphenol	1.634	1.039	81.38	80.0	-1.7
2,2'-oxybis(1-Chloropropane)	4.322	2.682	79.45	80.0	.7
bis(2-Chloroisopropyl)ether	4.322	2.682	79.45	80.0	.7
4-Methylphenol	1.545	.885	73.51	80.0	8.1
3 or 4-Methylphenol	1.545	.885	73.51	80.0	8.1
Acetophenone	5.645	3.435	77.89	80.0	2.6
N-Nitroso-di-n-propylamine	* 1.357	.872	83.41	80.0	-4.3*
o-Toluidine	3.396	1.872	71.74	80.0	10.3
Hexachloroethane	.966	.606	80.33	80.0	-.4
Nitrobenzene	.658	.427	83.11	80.0	-3.9
Isophorone	* 1.164	.729	80.17	80.0	-.2
2-Nitrophenol	* .319	.221	88.47	80.0	-10.6*
2,4-Dimethylphenol	.566	.380	86.00	80.0	-7.5
Benzoic acid	.401	.269	81.38	80.0	-1.7
bis(2-Chloroethoxy)methane	.677	.423	79.94	80.0	.1
2,4-Dichlorophenol	* .488	.311	81.53	80.0	-1.9*
1,2,4-Trichlorobenzene	.556	.357	82.19	80.0	-2.7
Naphthalene	1.498	.938	80.19	80.0	-.2
4-Chloroaniline	.686	.439	81.83	80.0	-2.3
Hexachlorobutadiene	* .368	.237	82.48	80.0	-3.1*
4-Chloro-3-methylphenol	* .499	.330	84.71	80.0	-5.9*
2-Methylnaphthalene	.953	.610	81.98	80.0	-2.5
Hexachlorocyclopentadiene	# .754	.534	83.13	80.0	-3.9*
2,4,6-Trichlorophenol	* .748	.475	81.27	80.0	-1.6*
2,4,5-Trichlorophenol	.779	.535	87.97	80.0	-10.0
2-Chloronaphthalene	1.957	1.206	78.91	80.0	1.4
2-Nitroaniline	.824	.564	81.85	80.0	-2.3

<sup>7C</sup>  
SEMIVOLATILE CONTINUING CALIBRATION CHECK

Lab Name: LANCASTER LABS

Contract: \_\_\_\_\_

Lab Code: LANCAS Case No.: \_\_\_\_\_. SAS No.: \_\_\_\_\_. SDG No.: \_\_\_\_\_

Instrument ID: HP03189 Calibration Date: 06/28/95 Time: 13:03

Lab File ID: >V6303 Init. Calib. Date(s): 06/27/95 06/28/95

Min RRF50 for SPCC(#) = 0.050

Max %Drift for CCC(\*) = 20.0%

COMPOUND	RRF	RRF80	ACTUAL CONC	TRUE CONC	% DRIFT
Dimethylphthalate	2.278	1.441	81.01	80.0	-1.3
1,3-Dinitrobenzene	0.000	0.000	0.00	80.0	100.0
2,6-Dinitrotoluene	.485	.341	82.33	80.0	-2.9
Acenaphthylene	3.032	1.924	81.21	80.0	-1.5
3-Nitroaniline	.550	.360	83.65	80.0	-4.6
Acenaphthene	* 1.933	1.213	80.30	80.0	-.4*
2,4-Dinitrophenol	* .293	.193	78.49	80.0	1.9
4-Nitrophenol	* .313	.204	83.41	80.0	-4.3
Dibenzofuran	2.589	1.637	80.93	80.0	-1.2
2,4-Dinitrotoluene	.717	.455	81.37	80.0	-1.7
1-Naphthylamine	2.203	1.373	79.79	80.0	-.3
2-Naphthylamine	1.893	1.201	81.17	80.0	-1.5
Diethylphthalate	2.216	1.348	77.87	80.0	2.7
4-Chlorophenyl-phenylether	1.065	.672	80.73	80.0	-.9
Fluorene	2.011	1.256	79.99	80.0	-.0
4-Nitroaniline	.506	.319	74.55	80.0	6.8
4,6-Dinitro-2-methylphenol	.216	.143	85.12	80.0	-6.4
N-Nitrosodiphenylamine (1)	* .880	.575	83.66	80.0	-4.6*
1,2-Diphenylhydrazine	1.592	1.032	82.99	80.0	-3.7
4-Bromophenyl-phenylether	.434	.293	86.30	80.0	-7.9
Hexachlorobenzene	.592	.380	82.25	80.0	-2.8
Pentachlorophenol	* .316	.201	77.16	80.0	3.6*
Phenanthrene	1.802	1.116	79.31	80.0	.9
Anthracene	1.821	1.136	79.86	80.0	.2
Carbazole	1.612	.925	73.44	80.0	8.2
Di-n-butylphthalate	2.031	1.136	71.63	80.0	10.5
Fluoranthene	* 1.770	.972	70.30	80.0	12.1*
Benzidine	1.111	.615	283.70	320.0	11.3
Pyrene	2.779	1.520	70.02	80.0	12.5
Butylbenzylphthalate	1.024	.617	72.24	80.0	9.7
3,3'-Dichlorobenzidine	.698	.476	79.95	80.0	.1
Benzo(a)anthracene	1.861	1.148	78.96	80.0	1.3
bis(2-Ethylhexyl)phthalate	1.376	.822	76.45	80.0	4.4
Chrysene	1.817	1.134	79.85	80.0	.2
Di-n-octylphthalate	* 3.198	2.097	83.38	80.0	-4.2*
7,12-Dimethylbenz[a]anthracene	1.297	.882	87.11	80.0	-8.9
Benzo(b)fluoranthene	2.664	1.754	84.28	80.0	-5.3
Benzo(k)fluoranthene	2.502	1.558	79.71	80.0	.4

(1) Cannot be separated from Diphenylamine

7C cont  
SEMIVOLATILE CONTINUING CALIBRATION CHECK

Lab Name: LANCASTER LABS

Contract: \_\_\_\_\_

Lab Code: LANCAS

Case No.: \_\_\_\_\_. SAS No.: \_\_\_\_\_. SDG No.: \_\_\_\_\_.

Instrument ID: HP03189

Calibration Date: 06/28/95 Time: 13:03

Lab File ID: >V6303

Init. Calib. Date(s): 06/27/95 06/28/95

Min RRF50 for SPCC(#) = 0.050

Max %Drift for CCC(\*) = 20.0%

COMPOUND	RRF	RRF80	ACTUAL CONC	TRUE CONC	% DRIFT
Benzo(a)pyrene	* 2.286	1.529	85.57	80.0	-7.0*
Indeno{1,2,3-cd}pyrene	1.687	1.088	82.51	80.0	-3.1
Dibenz(a,h)anthracene	1.669	1.074	82.38	80.0	-3.0
Benzo(g,h,i)perylene	1.597	1.022	81.89	80.0	-2.4
2-Fluorophenol	1.822	1.151	80.89	80.0	-1.1
Phenol-d5	2.139	1.296	77.58	80.0	3.0
Phenol-d6	2.139	1.296	77.58	80.0	3.0
Nitrobenzene-d5	.634	.421	84.95	80.0	-6.2
2-Fluorobiphenyl	2.200	1.367	79.51	80.0	.6
2,4,6-Tribromophenol	.523	.341	83.36	80.0	-4.2
Terphenyl-d14	1.748	.973	71.24	80.0	11.0

(1) Cannot be separated from Diphenylamine

FORM VII SV-2

1/87 Rev

Benzidine level in the 50 standard is 200 ng/uL.

1D

## PESTICIDE ORGANICS ANALYSIS DATA SHEET

SAMPLE CODE NO.

PBLKU2

Lab Name: Lancaster Laboratories

Contract:

Lab Code: Case No.:

SAS No.:

SDG No.: LKW01Matrix: (soil/water) SOILLab Sample ID: BLANKASample wt/vol: 30.0 (g/ml) G

Lab File ID:

% Moisture:

Date Received:

Extraction: (SepF/Cont/Sonc) SONCDate Extracted: 03/06/98Concentrated Extract Volume 10000 (uL)Date Analyzed: 03/18/98Injection Volume: 1 (uL)Dilution Factor: 1

GPC Cleanup: (Y/N) N pH:

Sulfur Cleanup: (Y/N) N

## CONCENTRATION UNITS:

CAS NO.	COMPOUND	(UG/L or UG/KG)	UG/KG	Q
319-84-6	alpha-BHC		0.067	U
58-89-9	gamma-BHC (Lindane)		0.067	U
319-85-7	beta-BHC		0.067	U
319-86-8	delta-BHC		0.067	U
76-44-8	Heptachlor		0.067	U
309-00-2	Aldrin		0.067	U
1024-57-3	Heptachlor epoxide		0.067	U
72-55-9	4, 4'-DDE		0.13	U
959-98-8	Endosulfan I		0.067	U
60-57-1	Dieldrin		0.13	U
72-20-8	Endrin		0.13	U
72-54-8	4, 4'-DDD		0.13	U
33213-65-9	Endosulfan II		0.13	U
50-29-3	4, 4'-DDT		0.13	U
7421-93-4	Endrin aldehyde		0.13	U
72-43-5	Methoxychlor		0.67	U
1031-07-8	Endosulfan sulfate		0.13	U
11104-28-2	Aroclor-1221		3.3	U
12674-11-2	Aroclor-1016		3.3	U
11141-16-5	Aroclor-1232		3.3	U
53469-21-9	Aroclor-1242		3.3	U
12672-29-6	Aroclor-1248		3.3	U
57-74-9	Chlordane (Technical)		3.3	U
11097-69-1	Aroclor-1254		3.3	U
11096-82-5	Aroclor-1260		3.3	U
8001-35-2	Toxaphene		6.7	U

FORM I PEST

#Name?

**2F**  
**SOIL PESTICIDE SURROGATE RECOVERY**

Lab Name: Lancaster Laboratories

Contract:

Lab Code:

Case No.:

SAS No.:

SDG No.: LKW01

GC Column(1): RTX-CLP ID: 0.53 (mm)

GC Column(2): RTXCLPB ID: 0.53 (mm)

SAMPLE	SAMPLE CODE NO.	TCX 1 %REC #	TCX 2 %REC #	DCB 1 %REC #	DCB 2 %REC #	TOT OUT
01 LCSA	LCSOS	97	111	106	108	0
02 BLANKA	PBLKU2	96	110	104	107	0
03 2887307	SB279	100	112	107	110	0
04 2887307 MS	SB279MS	98	110	102	107	0
05 2887307 MSD	SB279MSD	92	104	99	104	0
06 2887310	SB581	96	111	105	107	0
07 2887311	SB681	99	113	108	110	0

ADVISORY QC LIMITS	NOMINAL CONCENTRATION
-----------------------	--------------------------

TCX = Tetrachloro-m-xylene (50-120) 13.4 ug/Kg

DCB = Decachlorobiphenyl (50-120) 13.4 ug/Kg

# Column to be used to flag recovery values

\* Values outside of QC limits

D Surrogate diluted out

3F

**SOIL PESTICIDE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY**Lab Name: Lancaster Laboratories

Contract:

Lab Code:

Case No.:

SAS No.:

SDG No.: LKW01Matrix Spike - Sample Code No.: SB279

Compound	Spike Added (ug/Kg)	Sample Concen (ug/Kg)	MS Concen (ug/Kg)	MSD Concen (ug/Kg)	MS % REC#	MSD % REC#	MS-MSD % REC Limits	% RPD #	% RPD LIM
alpha-BHC	7.40	0.0939	7.91	7.40	106	99	(48-144)	7	50
gamma-BHC (Lindan)	7.39	0	8.74	8.42	118	114	(51-142)	4	50
beta-BHC	7.40	0	7.14	6.66	96	90	(34-145)	7	50
delta-BHC	7.39	0	9.51	8.77	129	119	(44-145)	8	50
Heptachlor	7.39	0	8.29	7.93	112	107	(60-137)	4	50
Aldrin	7.40	0	7.57	7.26	102	98	(49-145)	4	50
Heptachlor epoxid	7.40	0	7.68	7.40	104	100	.0008-1	4	50
4,4'-DDE	7.40	0	8.35	7.94	113	107	(61-135)	5	50
Endosulfan I	7.40	0	6.70	6.43	91	87	(46-135)	4	50
Dieldrin	7.40	0	7.15	6.85	97	93	(59-130)	4	50
Endrin	7.39	0	9.18	8.74	124	118	(69-152)	5	50
4,4'-DDD	7.39	0	9.29	8.76	126	119	(53-141)	6	50
Endosulfan II	7.40	0	7.10	6.55	96	89	(48-132)	8	50
4,4'-DDT	7.40	0	9.37	8.82	127	119	(60-138)	6	50
Endrin aldehyde	7.39	0	4.56	4.19	62	57	(28-166)	8	50
Methoxychlor	7.40	0	11.9	11.0	161	149	(52-174)	8	50
Endosulfan sulfat	7.39	0	8.39	7.24	114	98	(40-150)	15	50

# Column to be used to flag recovery and RPD values with an asterisk

Values outside of QC limits

RPD: 0 out of 17 outside limits

Spike Recovery: 0 out of 34 outside limits

COMMENTS: \_\_\_\_\_

Sample No.: 2887307

Batch: 980650001A

**3F**  
**SOIL PESTICIDE LAB CONTROL SPIKE/LAB CONTROL SPIKE DUPLICATE**

Lab Name: Lancaster Laboratories

Contract:

Lab Code: Case No.:

SAS No.:

SDG No.: LKW01

Lab Control Spike - Sample Code No.: LCSOS

Compound	Spike Added (ug/Kg)	LCS Concen (ug/Kg)	LCSD Concen (ug/Kg)	LCS % REC#	LCSD % REC#	LCS-LCSD % REC Limits	# RPD	% RPD LIM
alpha-BHC	6.69	6.96		104		(48-144)		50
gamma-BHC (Lindan)	6.69	7.87		118		(51-142)		50
beta-BHC	6.70	6.39		95		(34-145)		50
delta-BHC	6.69	8.37		125		(44-145)		50
Heptachlor	6.69	7.43		111		(60-137)		50
Aldrin	6.69	6.89		103		(49-145)		50
Heptachlor epoxid	6.69	6.9		103		(59-136)		50
4,4'-DDE	6.70	7.41		111		(61-135)		50
Endosulfan I	6.70	6.04		90		(46-135)		50
Dieldrin	6.69	6.51		97		(59-130)		50
Endrin	6.69	8.29		124		(69-152)		50
4,4'-DDD	6.69	8.28		124		(53-141)		50
Endosulfan II	6.70	6.43		96		(48-132)		50
4,4'-DDT	6.69	8.4		126		(60-138)		50
Endrin aldehyde	6.69	4.41		66		(28-166)		50
Methoxychlor	6.69	10.7		160		(52-174)		50
Endosulfan sulfat	6.69	7.52		112		(40-150)		50

# Column to be used to flag recovery and RPD values with an asterisk

\* Values outside of QC limits

RPD: 0 out of 17 outside limits

Spike Recovery: 0 out of 34 outside limits

COMMENTS: \_\_\_\_\_

Sample No.: LCSA

Batch: 980650001A

4C

## PESTICIDE METHOD BLANK SUMMARY

SAMPLE CODE NO.

PBLKU2

Lab Name: Lancaster Laboratories

Contract:

Lab Code: Case No.:

SAS No.:

SDG No.: LKW01Lab Sample ID: BLANKA

Lab File ID:

Matrix: (soil/water) SOILExtraction: (SepF/Cont/Sonc) SONCSulfur Cleanup: (Y/N) NDate Extracted: 03/06/98Date Analyzed (1): 03/18/98Date Analyzed (2): 03/18/98Time Analyzed (1): 0:12Time Analyzed (2): 0:12Instrument ID (1): H1674AInstrument ID (2): H1674BGC Column (1): RTX-CAP ID: 0.53 (mm)GC Column (2): RTXCLPB ID: 0.53 (mm)

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD

	SAMPLE CODE NO.	LAB SAMPLEID	DATE ANALYZED 1	DATE ANALYZED 2
01	LCSOS	LCSA	03/18/98	03/18/98
02	PBLKU2	BLANKA	03/18/98	03/18/98
03	SB279	2887307	03/18/98	03/18/98
04	SE279MS	2887307	03/18/98	03/18/98
05	SB279MSD	2887307	03/18/98	03/18/98
06	SB581	2887310	03/18/98	03/18/98
07	SB681	2887311	03/18/98	03/18/98

COMMENTS: \_\_\_\_\_

**6D**  
**PESTICIDE INITIAL CALIBRATION - RETENTION TIME SUMMARY**

Lab Name: Lancaster Laboratories

Contract:

Lab Code: Case No.:

SAS No.:

SDG No.: LKW01

Instrument: H1674A

Calibration File: 1P6076

GC Column(1): RTX-CLP ID: 0.53 (mm)

Date(s) Analyzed: 03/17/98    03/17/98

COMPOUND	RT OF STANDARDS					MIDPOINT RT	RT WINDOW	
	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4	LEVEL 5		FROM	TO
alpha-BHC	3.07	3.07	3.07	3.07	3.07	3.07	3.04	3.10
gamma-BHC (Lindane)	3.42	3.42	3.42	3.42	3.42	3.42	3.39	3.45
beta-BHC	3.51	3.51	3.52	3.52	3.52	3.52	3.49	3.55
delta-BHC	3.72	3.72	3.72	3.72	3.72	3.72	3.69	3.75
Heptachlor	3.99	3.99	3.99	3.99	3.99	3.99	3.96	4.02
Aldrin	4.35	4.35	4.35	4.35	4.35	4.35	4.32	4.38
Heptachlor epoxide	5.05	5.05	5.06	5.06	5.06	5.06	5.03	5.09
4,4'-DDE	5.46	5.46	5.46	5.46	5.46	5.46	5.43	5.49
Endosulfan I	5.52	5.52	5.52	5.52	5.53	5.52	5.49	5.55
Dieldrin	5.81	5.81	5.82	5.82	5.82	5.82	5.79	5.85
Endrin	6.09	6.09	6.09	6.09	6.09	6.09	6.06	6.13
4,4'-DDD	6.17	6.17	6.17	6.17	6.17	6.17	6.14	6.20
Endosulfan II	6.36	6.36	6.36	6.36	6.36	6.36	6.33	6.40
4,4'-DDT	6.51	6.51	6.52	6.52	6.52	6.52	6.48	6.55
Endrin aldehyde	6.85	6.85	6.86	6.86	6.86	6.86	6.83	6.89
Methoxychlor	7.12	7.12	7.13	7.13	7.12	7.13	7.10	7.16
Endosulfan sulfate	7.37	7.37	7.38	7.38	7.38	7.38	7.35	7.41
Tetrachloro-m-xylene	2.50	2.51	2.51	2.51	2.51	2.51	2.48	2.54
Decachlorobiphenyl	8.99	8.99	8.99	8.99	8.99	8.99	8.96	9.02

6D

## PESTICIDE INITIAL CALIBRATION - RETENTION TIME SUMMARY

Lab Name: Lancaster Laboratories

Contract:

Lab Code: Case No.:

SAS No.:

SDG No.: LKW01Instrument: H1674BCalibration File: 1P6076BGC Column(1): RTXCLP3 ID: 0.53 (mm)Date(s) Analyzed: 03/17/98 03/17/98

COMPOUND	RT OF STANDARDS					MIDPOINT RT	RT WINDOW	
	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4	LEVEL 5		FROM	TO
alpha-BHC	2.99	2.99	2.99	2.99	2.99	2.99	2.96	3.02
gamma-BHC (Lindane)	3.39	3.39	3.39	3.39	3.39	3.39	3.36	3.42
beta-BHC	3.49	3.49	3.49	3.49	3.49	3.49	3.46	3.52
delta-BHC	3.83	3.83	3.83	3.83	3.83	3.83	3.80	3.86
Heptachlor	3.89	3.90	3.90	3.90	3.90	3.90	3.87	3.93
Aldrin	4.27	4.27	4.28	4.28	4.28	4.28	4.25	4.31
Heptachlor epoxide	4.96	4.96	4.96	4.96	4.96	4.96	4.93	4.99
Endosulfan I	5.42	5.43	5.43	5.43	5.43	5.43	5.40	5.46
4,4'-DDE	5.59	5.59	5.59	5.59	5.59	5.59	5.56	5.62
Dieledrin	5.76	5.76	5.76	5.76	5.76	5.76	5.73	5.79
Endrin	6.12	6.12	6.13	6.13	6.13	6.13	6.10	6.16
4,4'-DDD	6.29	6.29	6.30	6.30	6.29	6.30	6.27	6.33
Endosulfan II	6.38	6.39	6.39	6.39	6.39	6.39	6.36	6.42
4,4'-DDT	6.67	6.67	6.67	6.67	6.67	6.67	6.64	6.70
Endrin aldehyde	6.80	6.80	6.80	6.80	6.80	6.80	6.77	6.83
Endosulfan sulfate	7.13	7.14	7.14	7.14	7.14	7.14	7.11	7.17
Methoxychlor	7.53	7.53	7.53	7.53	7.53	7.53	7.50	7.56
Tetrachloro-m-xylene	2.36	2.36	2.36	2.36	2.36	2.36	2.33	2.39
Decachlorobiphenyl	9.31	9.31	9.32	9.32	9.31	9.32	9.29	9.35

**6E**  
**PESTICIDE INITIAL CALIBRATION - CALIBRATION FACTOR SUMMARY**

Lab Name: Lancaster Laboratories

Contract:

Lab Code: Case No.:

SAS No.:

SDG No.: LKW01

Instrument: H1674A

Calibration File: 1P6076

GC Column(1): RTX-CLP ID: 0.53 (mm)

Date(s) Analyzed: 03/17/98    03/17/98

COMPOUND	CALIBRATION FACTORS					MEAN	% RSD
	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4	LEVEL 5		
alpha-BHC	1.21E+03	1.20E+03	1.25E+03	1.51E+03	1.33E+03	1.30E+03	10.1
gamma-BHC (Lindane)	1.20E+03	1.18E+03	1.22E+03	1.46E+03	1.27E+03	1.27E+03	9.1
beta-BHC	5.15E+02	5.53E+02	5.80E+02	6.72E+02	5.70E+02	5.78E+02	10.0
delta-BHC	8.09E+02	8.23E+02	8.55E+02	1.07E+03	9.74E+02	9.07E+02	12.5
Heptachlor	1.33E+03	1.29E+03	1.33E+03	1.51E+03	1.29E+03	1.35E+03	7.0
Aldrin	1.22E+03	1.17E+03	1.21E+03	1.41E+03	1.21E+03	1.24E+03	7.6
Heptachlor epoxide	1.30E+03	1.23E+03	1.27E+03	1.43E+03	1.21E+03	1.29E+03	6.7
4,4'-DDE	6.91E+02	6.88E+02	7.21E+02	8.62E+02	7.57E+02	7.44E+02	9.6
Endosulfan I	1.21E+03	1.24E+03	1.27E+03	1.42E+03	1.20E+03	1.27E+03	7.2
Dieldrin	1.03E+03	1.03E+03	1.06E+03	1.25E+03	1.08E+03	1.09E+03	8.5
Endrin	7.90E+02	7.62E+02	7.87E+02	9.21E+02	7.90E+02	8.10E+02	7.8
4,4'-DDD	3.87E+02	3.77E+02	4.00E+02	5.05E+02	4.62E+02	4.26E+02	12.9
Endosulfan II	1.00E+03	9.43E+02	9.66E+02	1.12E+03	9.61E+02	9.99E+02	7.2
4,4'-DDT	4.81E+02	5.00E+02	5.35E+02	6.67E+02	6.05E+02	5.58E+02	13.9
Endrin aldehyde	8.06E+02	7.51E+02	7.60E+02	8.39E+02	7.36E+02	7.78E+02	5.5
Methoxychlor	2.17E+02	2.26E+02	2.46E+02	2.99E+02	2.65E+02	2.50E+02	13.1
Endosulfan sulfate	8.43E+02	8.13E+02	8.35E+02	9.68E+02	8.29E+02	8.58E+02	7.3
Tetrachloro-m-xylene	1.05E+03	1.03E+03	1.04E+03	1.15E+03	9.44E+02	1.04E+03	7.1
Decachlorobiphenyl	1.27E+03	1.20E+03	1.17E+03	1.21E+03	9.65E+02	1.16E+03	10.0
Average % RSD:							9.1

6E

## PESTICIDE INITIAL CALIBRATION - CALIBRATION FACTOR SUMMARY

Lab Name: Lancaster Laboratories

Contract:

Lab Code: Case No.:

SAS No.:

SDG No.: LKW01Instrument: H1674BCalibration File: 1P6076BGC Column(1): RTXCLPE ID: 0.53 (mm)Date(s) Analyzed: 03/17/98 03/17/98

COMPOUND	CALIBRATION FACTORS					MEAN	% RSD
	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4	LEVEL 5		
alpha-BHC	4.89E+02	4.95E+02	5.60E+02	7.54E+02	7.23E+02	6.04E+02	20.9
gamma-BHC (Lindane)	4.96E+02	4.99E+02	5.63E+02	7.43E+02	7.05E+02	6.01E+02	19.3
beta-BHC	2.65E+02	2.52E+02	2.83E+02	3.43E+02	3.03E+02	2.89E+02	12.3
delta-BHC	4.13E+02	3.48E+02	3.80E+02	4.96E+02	4.70E+02	4.22E+02	14.6
Heptachlor	6.31E+02	6.20E+02	6.64E+02	8.02E+02	7.15E+02	6.86E+02	10.8
Aldrin	6.67E+02	6.60E+02	7.33E+02	9.47E+02	8.80E+02	7.77E+02	16.7
Heptachlor epoxide	6.40E+02	6.29E+02	6.95E+02	8.31E+02	7.52E+02	7.09E+02	11.8
Endosulfan I	6.84E+02	6.47E+02	6.97E+02	8.29E+02	7.45E+02	7.20E+02	9.7
4,4'-DDE	2.61E+02	2.54E+02	2.82E+02	3.42E+02	3.18E+02	2.91E+02	12.9
Dieldrin	5.48E+02	5.56E+02	6.21E+02	8.12E+02	7.58E+02	6.59E+02	18.2
Erdrin	4.00E+02	4.01E+02	4.45E+02	5.64E+02	5.16E+02	4.65E+02	15.6
4,4'-DDD	1.60E+02	1.57E+02	1.74E+02	2.15E+02	1.97E+02	1.81E+02	13.7
Endosulfan II	5.71E+02	5.68E+02	6.13E+02	7.59E+02	6.83E+02	6.39E+02	12.8
4,4'-DDT	1.89E+02	1.94E+02	2.18E+02	2.67E+02	2.40E+02	2.22E+02	14.7
Erdrin aldehyde	4.58E+02	4.55E+02	4.85E+02	5.63E+02	5.21E+02	4.96E+02	9.2
Endosulfan sulfate	5.12E+02	4.95E+02	5.39E+02	6.54E+02	5.82E+02	5.56E+02	11.5
Methoxychlor	9.01E+01	8.82E+01	9.80E+01	1.14E+02	9.88E+01	9.79E+01	10.6
Tetrachloro-m-xylene	5.30E+02	5.28E+02	5.92E+02	7.41E+02	6.50E+02	6.08E+02	14.8
Decachlorobiphenyl	7.82E+02	7.28E+02	7.10E+02	7.32E+02	5.85E+02	7.07E+02	10.4

Average % RSD: 13.7

**6F**  
**PESTICIDE INITIAL CALIBRATION OF MULTICOMPONENT ANALYTES**

Lab Name: Lancaster Laboratories

Contract:

Lab Code:

Case No.:

SAS No.:

SDG No.: LKW01

Instrument: H1674A

Calibration File: 1P6076

GC Column(1): RTX-CLP ID: 0.53 (mm)

Date(s) Analyzed: 03/17/98    03/17/98

COMPOUND	PEAK	RT	RT WINDOW FROM	TO	CALIBRATION FACTOR	LEVEL	AMOUNT (ng)	PEAK HEIGHT	% RSD
Aroclor-1260	1	5.82	5.79	5.85	48	1	50.1	2555	8.4
						2	100.2	5053	
						3	200.4	10211	
						4	501	22783	
						5	1002	42154	
	2	6.14	6.11	6.17	49	1	50.1	2563	7.1
						2	100.2	5128	
						3	200.4	10282	
						4	501	23237	
						5	1002	43920	
	3	6.62	6.59	6.65	43	1	50.1	2295	8.2
						2	100.2	4485	
						3	200.4	9044	
						4	501	20342	
						5	1002	37760	
	4	6.93	6.90	6.96	34	1	50.1	1835	6.8
						2	100.2	3517	
						3	200.4	7128	
						4	501	16592	
						5	1002	30783	
	5	7.29	7.26	7.32	101	1	50.1	5297	5.2
						2	100.2	10558	
						3	200.4	20727	
						4	501	48905	
						5	1002	94061	
	6	8.39	8.36	8.42	27	1	50.1	1353	2.3
						2	100.2	2774	
						3	200.4	5405	
						4	501	13120	
						5	1002	26335	
Aroclor-1254	1	4.82	4.79	4.85	41	1	100	4074	
	2	5.12	5.09	5.15	58	1	100	5798	
	3	5.40	5.37	5.43	8	1	100	840	
	4	5.45	5.42	5.48	25	1	100	2522	
	5	5.82	5.79	5.85	22	1	100	2166	
	6	5.93	5.90	5.96	23	1	100	2326	
Aroclor-1221	1	2.68	2.65	2.71	8	1	251.25	2005	
	2	2.83	2.80	2.86	3	1	251.25	715	
	3	2.37	2.84	2.90	20	1	251.25	4943	

**6F**  
**PESTICIDE INITIAL CALIBRATION OF MULTICOMPONENT ANALYTES**

Lab Name: Lancaster Laboratories

Contract:

Lab Code:

Case No.:

SAS No.:

SDG No.: LKW01

Instrument: H1674A

Calibration File: 1P6076

GC Column(1): RTX-CLP ID: 0.53 (mm)

Date(s) Analyzed: 03/17/98    03/17/98

COMPOUND	PEAK	RT	RT WINDOW FROM		CALIBRATION FACTOR	LEVEL	AMOUNT (ng)	PEAK HEIGHT	% RSD
Aroclor-1232	1	2.89	2.86	2.92	19	1	250	4780	
	2	3.25	3.22	3.28	14	1	250	3561	
	3	3.47	3.44	3.50	7	1	250	1825	
	4	3.76	3.73	3.79	14	1	250	3582	
	5	4.14	4.11	4.17	9	1	250	2126	
	6	4.38	4.35	4.41	8	1	250	2046	
Aroclor-1248	1	3.25	3.22	3.28	15	1	100	1463	
	2	3.76	3.73	3.79	15	1	100	1531	
	3	4.14	4.11	4.17	34	1	100	3356	
	4	4.38	4.35	4.41	30	1	100	2997	
	5	4.90	4.87	4.93	26	1	100	2608	
	6	5.12	5.09	5.15	26	1	100	2612	

**6F**  
**PESTICIDE INITIAL CALIBRATION OF MULTICOMPONENT ANALYTES**

Lab Name: Lancaster Laboratories

Contract:

Lab Code: Case No.:

SAS No.:

SDG No.: LKW01

Instrument: H1674A

Calibration File: 1P6076

GC Column(1): RTX-CLP ID: 0.53 (mm)

Date(s) Analyzed: 03/17/98    03/17/98

COMPOUND	PEAK	RT	RT WINDOW FROM	TO	CALIBRATION FACTOR	LEVEL	AMOUNT (ng)	PEAK HEIGHT	% RSD
Aroclor-1016	1	2.87	2.84	2.90	15	1	50.12	772	3.5
						2	100.24	1539	
						3	200.48	2981	
						4	501.2000	7336	
						5	1002.400	14167	
	2	3.25	3.22	3.28	35	1	50.12	1879	6.9
						2	100.24	3708	
						3	200.48	7269	
						4	501.2000	17063	
						5	1002.400	31674	
	3	3.76	3.73	3.79	38	1	50.12	1934	2.1
						2	100.24	3873	
						3	200.48	7530	
						4	501.2000	18821	
						5	1002.400	36823	
	4	3.91	3.88	3.94	14	1	50.12	719	1.4
						2	100.24	1430	
						3	200.48	2875	
						4	501.2000	7319	
						5	1002.400	14756	
	5	4.38	4.35	4.41	22	1	50.12	1112	3.1
						2	100.24	2214	
						3	200.48	4325	
						4	501.2000	10689	
						5	1002.400	20560	
	6	4.82	4.79	4.85	14	1	50.12	705	4.3
						2	100.24	1457	
						3	200.48	3016	
						4	501.2000	7032	
						5	1002.400	13425	
Aroclor-1242	1	2.90	2.87	2.93	50	1	200.8000	10053	
	2	3.25	3.22	3.28	28	1	200.8000	5674	
	3	3.76	3.73	3.79	28	1	200.8000	5689	
	4	3.91	3.88	3.94	11	1	200.8000	2141	
	5	4.38	4.35	4.41	17	1	200.8000	3460	
	6	4.90	4.87	4.93	14	1	200.8000	2761	

6F

## PESTICIDE INITIAL CALIBRATION OF MULTICOMPONENT ANALYTES

Lab Name: Lancaster Laboratories

Contract:

Lab Code:

Case No.:

SAS No.:

SDG No.: LKW01Instrument: H1674ACalibration File: 1P6076GC Column(1): RTX-CLP ID: 0.53 (mm)Date(s) Analyzed: 03/17/98    03/17/98

COMPOUND	PEAK	RT	RT WINDOW		CALIBRATION FACTOR	LEVEL	AMOUNT (ng)	PEAK HEIGHT	% RSD
			FROM	TO					
Chlordane (Technical)	1	3.88	3.85	3.91	47	1	200.6000	9462	
	2	3.99	3.96	4.02	57	1	200.6000	11515	
	3	4.49	4.46	4.52	65	1	200.6000	13047	
	4	5.21	5.18	5.24	124	1	200.6000	24806	
	5	5.37	5.34	5.40	191	1	200.6000	38290	
	6	6.15	6.12	6.18	23	1	200.6000	4550	
Tcxaphene	1	6.18	6.15	6.21	9	1	501.5	4553	
	2	6.33	6.30	6.36	17	1	501.5	8475	
	3	6.46	6.43	6.49	14	1	501.5	7141	
	4	6.76	6.73	6.79	9	1	501.5	4585	
	5	7.15	7.12	7.18	9	1	501.5	4503	
	6	7.27	7.24	7.30	16	1	501.5	7844	

**6F**  
**PESTICIDE INITIAL CALIBRATION OF MULTICOMPONENT ANALYTES**

Lab Name: Lancaster Laboratories

Contract:

Lab Code: Case No.:

SAS No.:

SDG No.: LKW01

Instrument: H1674B

Calibration File: 1P6076B

GC Column(1): RTXCLPB ID: 0.53 (mm)

Date(s) Analyzed: 03/17/98      03/17/98

COMPOUND	PEAK	RT	RT WINDOW FROM	TO	CALIBRATION FACTOR	LEVEL	AMOUNT (ng)	PEAK HEIGHT	% RSD
Aroclor-1260	1	5.99	5.96	6.02	27	1	50.1	1412	5.7
						2	100.2	2746	
						3	200.4	5563	
						4	501	12852	
						5	1002	24686	
	2	6.24	6.21	6.27	23	1	50.1	1207	4.3
						2	100.2	2403	
						3	200.4	4850	
						4	501	11257	
						5	1002	22112	
	3	6.44	6.41	6.47	19	1	50.1	993	6.1
						2	100.2	1944	
						3	200.4	4006	
						4	501	9154	
						5	1002	17322	
	4	6.67	6.64	6.70	24	1	50.1	1214	4.8
						2	100.2	2468	
						3	200.4	4857	
						4	501	11289	
						5	1002	22224	
	5	6.78	6.75	6.81	25	1	50.1	1318	5.7
						2	100.2	2614	
						3	200.4	5356	
						4	501	12212	
						5	1002	23365	
	6	7.44	7.41	7.47	36	1	50.1	1900	4.9
						2	100.2	3793	
						3	200.4	7352	
						4	501	17345	
						5	1002	34194	
Aroclor-1254	1	5.20	5.17	5.23	21	1	100	2149	
	2	5.61	5.58	5.64		13	1	100	1332
	3	5.75	5.72	5.78		24	1	100	2442
	4	6.24	6.21	6.27		11	1	100	1095
	5	6.43	6.40	6.46		12	1	100	1244
	6	6.67	6.64	6.70		21	1	100	2097
Aroclor-1221	1	2.64	2.61	2.67	4	1	251.25	1073	
	2	2.73	2.70	2.76		5	1	251.25	1150
	3	2.85	2.82	2.88		9	1	251.25	2230

6F

## PESTICIDE INITIAL CALIBRATION OF MULTICOMPONENT ANALYTES

Lab Name: Lancaster Laboratories

Contract:

Lab Code: Case No.:

SAS No.:

SDG No.: LKW01Instrument: H1674BCalibration File: 1P6076BGC Column(1): RTXCLPB ID: 0.53 (mm)Date(s) Analyzed: 03/17/98      03/17/98

COMPOUND	PEAK	RT	RT WINDOW FROM TO		CALIBRATION FACTOR	LEVEL	AMOUNT (ng)	PEAK HEIGHT	% RSD
Aroclor-1232	1	2.85	2.82	2.88	8	1	250	1972	
	2	3.29	3.26	3.32	7	1	250	1762	
	3	3.79	3.76	3.82	6	1	250	1507	
	4	3.94	3.91	3.97	3	1	250	873	
	5	4.48	4.45	4.51	4	1	250	1074	
	6	4.98	4.95	5.01	3	1	250	644	
Aroclor-1248	1	3.79	3.76	3.82	8	1	100	760	
	2	4.48	4.45	4.51	16	1	100	1582	
	3	4.63	4.60	4.66	12	1	100	1205	
	4	4.93	4.90	4.96	8	1	100	778	
	5	4.98	4.95	5.01	13	1	100	1280	
	6	5.26	5.23	5.29	3	1	100	301	

**6F**  
**PESTICIDE INITIAL CALIBRATION OF MULTICOMPONENT ANALYTES**

Lab Name: Lancaster Laboratories

Contract:

Lab Code: Case No.:

SAS No.:

SDG No.: LKW01

Instrument: H1674B

Calibration File: 1P6076B

GC Column(1): RTXCLPB ID: 0.53 (mm)

Date(s) Analyzed: 03/17/98    03/17/98

COMPOUND	PEAK	RT	RT WINDOW		CALIBRATION FACTOR	LEVEL	AMOUNT (ng)	PEAK HEIGHT	% RSD
Aroclor-1016	1	2.85	2.82	2.88	7	1	50.12	340	1.0
						2	100.24	697	
						3	200.48	1384	
						4	501.2000	3474	
						5	1002.400	6979	
	2	3.29	3.26	3.32	18	1	50.12	923	3.5
						2	100.24	1864	
						3	200.48	3626	
						4	501.2000	8849	
						5	1002.400	17058	
	3	3.79	3.76	3.82	16	1	50.12	802	2.7
						2	100.24	1638	
						3	200.48	3224	
						4	501.2000	8357	
						5	1002.400	17122	
	4	3.94	3.91	3.97	10	1	50.12	479	2.8
						2	100.24	977	
						3	200.48	1883	
						4	501.2000	4973	
						5	1002.400	10080	
	5	4.17	4.14	4.20	6	1	50.12	294	2.4
						2	100.24	601	
						3	200.48	1131	
						4	501.2000	2954	
						5	1002.400	5985	
	6	4.63	4.60	4.66	9	1	50.12	444	2.3
						2	100.24	874	
						3	200.48	1704	
						4	501.2000	4405	
						5	1002.400	9073	
Aroclor-1242	1	3.29	3.26	3.32	14	1	200.8000	2818	
	2	3.79	3.76	3.82	12	1	200.8000	2428	
	3	3.94	3.91	3.97	7	1	200.8000	1438	
	4	4.48	4.45	4.51	9	1	200.8000	1835	
	5	4.98	4.95	5.01	7	1	200.8000	1341	
	6	5.26	5.23	5.29	4	1	200.8000	889	

6F

## PESTICIDE INITIAL CALIBRATION OF MULTICOMPONENT ANALYTES

Lab Name: Lancaster Laboratories

Contract:

Lab Code:

Case No.:

SAS No.:

SDG No.: LKW01Instrument: H1674BCalibration File: 1P6076BGC Column(1): RTXCLPB ID: 0.53 (mm)Date(s) Analyzed: 03/17/98 03/17/98

COMPOUND	PEAK	RT	RT WINDOW FROM TO		CALIBRATION FACTOR	LEVEL	AMOUNT (ng)	PEAK HEIGHT	% RSD
Chlordane (Technical)	1	3.90	3.87	3.93	29	1	200.6000	5732	
	2	4.47	4.44	4.50	39	1	200.6000	7804	
	3	5.19	5.16	5.22	85	1	200.6000	16974	
	4	5.37	5.34	5.40	76	1	200.6000	15157	
	5	6.24	6.21	6.27	15	1	200.6000	2960	
	6	6.44	6.41	6.47	26	1	200.6000	5222	
Toxaphene	1	5.74	5.71	5.77	7	1	501.5	3422	
	2	6.37	6.34	6.40	13	1	501.5	6428	
	3	6.49	6.46	6.52	20	1	501.5	10176	
	4	6.71	6.68	6.74	6	1	501.5	2951	
	5	6.81	6.78	6.84	11	1	501.5	5522	
	6	7.43	7.40	7.46	9	1	501.5	4418	

**7D**  
**PESTICIDE CALIBRATION VERIFICATION SUMMARY**

Lab Name: Lancaster Laboratories

Contract:

Lab Code: Case No.:

SAS No.:

SDG No.: LKW01

Instrument: H1674A

Init. Calib. Date(s): 03/17/98 03/17/98

GC Column(1): RTX-CLP ID: 0.53 (mm)

Date Analyzed: 03/17/98

Lab File ID: 1P6076.05R

Time Analyzed: 14:45

Lab Standard ID: PEMAA

COMPOUND	RT	RT WINDOW FROM	TO	CALC AMOUNT (ng/ml)	NOM AMOUNT (ng/ml)	%D
alpha-BHC	3.07	3.04	3.10	9.10	10.00	-9.0
gamma-BHC (Lindane)	3.42	3.39	3.45	9.28	10.00	-7.2
beta-BHC	3.51	3.49	3.55	8.54	10.00	-14.6
4,4'-DDE	5.46	5.43	5.49	0.91		
Endrin	6.09	6.06	6.13	52.33	50.00	4.7
4,4'-DDD	6.17	6.14	6.20	4.41		
4,4'-DDT	6.51	6.48	6.55	101.83	100.00	1.8
Endrin aldehyde	6.85	6.83	6.89	2.38		
Methoxychlor	7.12	7.10	7.16	262.86	250.00	5.1
Endrin ketone	7.72	7.69	7.75	3.27		
Tetrachloro-m-xylene	2.50	2.48	2.54	19.16	20.00	-4.2
Decachlorobiphenyl	8.98	8.96	9.02	18.79	20.00	-6.0

4,4'-DDT % breakdown: 4.3   Endrin % breakdown: 11.6   Combined % breakdown: 15.8

**7D**  
**PESTICIDE CALIBRATION VERIFICATION SUMMARY**

Lab Name: Lancaster Laboratories

Contract:

Lab Code: Case No.:

SAS No.:

SDG No.: LKW01

Instrument: H1674A

Init. Calib. Date(s): 03/17/98    03/17/98

GC Column(1): RTX-CLF ID: 0.53 (mm)

Date Analyzed: 03/18/98

Lab File ID: 1P6076.50R

Time Analyzed: 4:54

Lab Standard ID: PEMC

COMPOUND	RT	RT WINDOW FROM	TO	CALC AMOUNT (ng/ml)	NOM AMOUNT (ng/ml)	%D
alpha-BHC	3.07	3.04	3.10	9.85	10.00	-1.5
gamma-BHC (Lindane)	3.42	3.39	3.45	10.06	10.00	0.6
beta-BHC	3.51	3.49	3.55	9.89	10.00	-1.1
4,4'-DDE	5.46	5.43	5.49	0.85		
Endrin	6.08	6.06	6.13	55.95	50.00	11.9
4,4'-DDD	6.17	6.14	6.20	6.33		
4,4'-DDT	6.51	6.48	6.55	114.45	100.00	14.5
Endrin aldehyde	6.85	6.83	6.89	2.06		
Methoxychlor	7.12	7.10	7.16	306.62	250.00	22.6
Endrin ketone	7.72	7.69	7.75	3.52		
Tetrachloro-m-xylene	2.50	2.48	2.54	20.77	20.00	3.8
Decachlorobiphenyl	8.98	8.96	9.02	21.29	20.00	6.5

4,4'-DDT % breakdown: 5.0    Endrin % breakdown: 10.9    Combined % breakdown: 15.8

**7D**  
**PESTICIDE CALIBRATION VERIFICATION SUMMARY**

Lab Name: Lancaster Laboratories

Contract:

Lab Code: Case No.:

SAS No.:

SDG No.: LKW01

Instrument: H1674B

Init. Calib. Date(s): 03/17/98 03/17/98

GC Column(1): RTXCLPB ID: 0.53 (mm)

Date Analyzed: 03/17/98

Lab File ID: 1P6076B.05R

Time Analyzed: 14:45

Lab Standard ID: PEMAA

COMPOUND	RT	RT WINDOW		CALC AMOUNT (ng/ml)	NOM AMOUNT (ng/ml)	%D
		FROM	TO			
alpha-BHC	2.99	2.96	3.02	10.51	10.00	5.1
gamma-BHC (Lindane)	3.39	3.36	3.42	10.91	10.00	9.1
beta-BHC	3.49	3.46	3.52	10.61	10.00	6.1
4,4'-DDE	5.59	5.56	5.62	1.18		
Endrin	6.12	6.10	6.16	62.99	50.00	26.0
4,4'-DDD	6.29	6.27	6.33	9.69		
4,4'-DDT	6.66	6.64	6.70	118.92	100.00	18.9
Endrin aldehyde	6.80	6.77	6.83	3.70		
Methoxychlor	7.52	7.50	7.56	307.75	250.00	23.1
Endrin ketone	7.78	7.76	7.82	3.29		
Tetrachloro-m-xylene	2.35	2.33	2.39	21.06	20.00	5.3
Decachlorobiphenyl	9.31	9.29	9.35	22.01	20.00	10.0

4,4'-DDT % breakdown: 7.2 Endrin % breakdown: 12.0 Combined % breakdown: 19.2

**7D**  
**PESTICIDE CALIBRATION VERIFICATION SUMMARY**

Lab Name: Lancaster Laboratories

Contract:

Lab Code: Case No.:

SAS No.:

SDG No.: LKW01

Instrument: H1674B

Init. Calib. Date(s): 03/17/98    03/17/98

GC Column(1): RTXCLPB ID: 0.53 (mm)

Date Analyzed: 03/18/98

Lab File ID: 1P6076B.50R

Time Analyzed: 4:54

Lab Standard ID: PEMCN

COMPOUND	RT	RT WINDOW FROM	TO	CALC AMOUNT (ng/ml)	NOM AMOUNT (ng/ml)	%D
alpha-BHC	2.99	2.96	3.02	10.38	10.00	3.8
gamma-BHC (Lindane)	3.39	3.36	3.42	10.81	10.00	8.1
beta-BHC	3.49	3.46	3.52	10.71	10.00	7.1
4,4'-DDE	5.59	5.56	5.62	1.12		
Endrin	6.12	6.10	6.16	61.98	50.00	24.0
4,4'-DDD	6.29	6.27	6.33	11.06		
4,4'-DDT	6.66	6.64	6.70	123.39	100.00	23.4
Endrin aldehyde	6.79	6.77	6.83	2.85		
Methoxychlor	7.52	7.50	7.56	325.80	250.00	30.3
Endrin ketone	7.78	7.76	7.82	3.39		
Tetrachloro-m-xylene	2.35	2.33	2.39	21.52	20.00	7.6
Decachlorobiphenyl	9.31	9.29	9.35	22.05	20.00	10.3

4,4'-DDT % breakdown: 7.8    Endrin % breakdown: 11.3    Combined % breakdown: 19.1

**7E**  
**PESTICIDE CALIBRATION VERIFICATION SUMMARY**

Lab Name: Lancaster Laboratories

Contract:

Lab Code: Case No.:

SAS No.: SDG No.: LKW01

Instrument: H1674A

Init. Calib. Date(s): 03/17/98 03/17/98

GC Column(1): RTX-CLP ID: 0.53 (mm)

Date Analyzed: 03/18/98

Lab File ID: 1P6076.51R

Time Analyzed: 5:13

Lab Standard ID: MIXA3AT

COMPOUND	RT	RT WINDOW FROM	TO	CALC AMOUNT (ng/ml)	NOM AMOUNT (ng/ml)	%D
alpha-BHC	3.07	3.04	3.10	7.99	8.00	-0.1
gamma-BHC (Lindane)	3.42	3.39	3.45	8.06	8.00	0.7
beta-BHC	3.51	3.49	3.55	8.64	8.00	8.0
delta-BHC	3.72	3.69	3.75	8.13	8.00	1.6
Heptachlor	3.99	3.96	4.02	8.15	8.00	1.8
Aldrin	4.35	4.32	4.38	7.91	8.00	-1.1
Heptachlor epoxide	5.05	5.03	5.09	8.14	8.00	1.7
4,4'-DDE	5.46	5.43	5.49	17.25	16.00	7.8
Endosulfan I	5.52	5.49	5.55	8.24	8.00	3.0
Dieldrin	5.81	5.79	5.85	15.92	16.00	-0.5
Endrin	6.08	6.06	6.13	16.04	16.00	0.2
4,4'-DDD	6.17	6.14	6.20	17.44	16.00	9.0
Endosulfan II	6.35	6.33	6.40	16.43	16.00	2.7
4,4'-DDT	6.51	6.48	6.55	16.40	16.00	2.5
Endrin aldehyde	6.85	6.83	6.89	16.91	16.00	5.7
Methoxychlor	7.12	7.10	7.16	88.46	80.00	10.6
Endosulfan sulfate	7.37	7.35	7.41	16.68	16.00	4.3
Tetrachloro-m-xylene	2.50	2.48	2.54	16.59	16.00	3.7
Decachlorobiphenyl	8.98	8.96	9.02	34.21	32.00	6.9
Average of %D:						3.8

7E

## PESTICIDE CALIBRATION VERIFICATION SUMMARY

Lab Name: Lancaster Laboratories

Contract:

Lab Code: Case No.:

SAS No.:

SDG No.: LKW01Instrument: H1674AInit. Calib. Date(s): 03/17/98 03/17/98GC Column(1): RTX-CLP ID: 0.53 (mm)Date Analyzed: 03/18/98Lab File ID: 1P6076.52RTime Analyzed: 5:32Lab Standard ID: AR163ES

COMPOUND	RT	RT WINDOW		CALC AMOUNT (ng/ml)	NOM AMOUNT (ng/ml)	%D
		FROM	TO			
Aroclor-1016	2.87	2.84	2.90	214.46	200.48	7.0
	3.25	3.22	3.28			
	3.75	3.73	3.79			
	3.90	3.88	3.94			
	4.37	4.35	4.41			
	4.82	4.79	4.85			
Aroclor-1260	5.81	5.79	5.85	220.91	200.40	10.2
	6.13	6.11	6.17			
	6.62	6.59	6.65			
	6.92	6.90	6.96			
	7.28	7.26	7.32			
	8.39	8.36	8.42			

Average of %D:

8.6

**7E**  
**PESTICIDE CALIBRATION VERIFICATION SUMMARY**

Lab Name: Lancaster Laboratories

Contract:

Lab Code: Case No.:

SAS No.:

SDG No.: LKW01

Instrument: H1674B

Init. Calib. Date(s): 03/17/98 03/17/98

GC Column(1): RTXCLPB ID: 0.53 (mm)

Date Analyzed: 03/18/98

Lab File ID: 1P6076B.51R

Time Analyzed: 5:13

Lab Standard ID: MIXA3AT

COMPOUND	RT	RT WINDOW FROM	TO	CALC AMOUNT (ng/ml)	NOM AMOUNT (ng/ml)	%D
alpha-BHC	2.99	2.96	3.02	8.31	8.00	3.9
gamma-BHC (Lindane)	3.39	3.36	3.42	8.43	8.00	5.4
beta-BHC	3.49	3.46	3.52	9.31	8.00	16.4
delta-BHC	3.83	3.80	3.86	8.47	8.00	5.8
Heptachlor	3.89	3.87	3.93	8.39	8.00	4.9
Aldrin	4.27	4.25	4.31	7.99	8.00	-0.1
Heptachlor epoxide	4.96	4.93	4.99	8.63	8.00	7.9
Endosulfan I	5.42	5.40	5.46	8.33	8.00	4.1
4,4'-DDE	5.59	5.56	5.62	19.02	16.00	18.9
Dieldrin	5.75	5.73	5.79	16.19	16.00	1.2
Endrin	6.12	6.10	6.16	16.69	16.00	4.3
4,4'-DDD	6.29	6.27	6.33	19.81	16.00	23.8
Endosulfan II	6.38	6.36	6.42	16.92	16.00	5.8
4,4'-DDT	6.66	6.64	6.70	18.56	16.00	16.0
Endrin aldehyde	6.80	6.77	6.83	17.48	16.00	9.2
Endosulfan sulfate	7.13	7.11	7.17	17.18	16.00	7.4
Methoxychlor	7.52	7.50	7.56	97.46	80.00	21.8
Tetrachloro-m-xylene	2.35	2.33	2.39	16.87	16.00	5.4
Decachlorobiphenyl	9.31	9.29	9.35	34.90	32.00	9.1
Average of %D:						9.0

**7E**  
**PESTICIDE CALIBRATION VERIFICATION SUMMARY**

Lab Name: Lancaster Laboratories

Contract:

Lab Code: Case No.:

SAS No.:

SDG No.: LKW01

Instrument: H1674B

Init. Calib. Date(s): 03/17/98    03/17/98

GC Column(1): RTXCLPE ID: 0.53 (mm)

Date Analyzed: 03/18/98

Lab File ID: 1P6076B.52R

Time Analyzed: 5:32

Lab Standard ID: AR1€3ES

COMPOUND	RT	RT WINDOW FROM      TO		CALC AMOUNT (ng/ml)	NOM AMOUNT (ng/ml)	%D
Aroclor-1016	2.85	2.82	2.88	222.72	200.48	11.1
	3.28	3.26	3.32			
	3.78	3.76	3.82			
	3.94	3.91	3.97			
	4.17	4.14	4.20			
	4.62	4.60	4.66			
Aroclor-1260	5.98	5.96	6.02	226.79	200.40	13.2
	6.23	6.21	6.27			
	6.44	6.41	6.47			
	6.66	6.64	6.70			
	6.77	6.75	6.81			
	7.44	7.41	7.47			

Average of %D: 12.1

8D

## PESTICIDE ANALYTICAL SEQUENCE

Lab Name: Lancaster Laboratories

Contract:

Lab Code: Case No.:

SAS No.: SDG No.: LKW01GC Column: RTX-CLP ID: 0.53 (mm)Init. Calib Date(s): 03/17/98 03/17/98Instrument: H1674ACalibration File: 1P6076

THIS ANALYTICAL SEQUENCE OF BLANKS, SAMPLES, AND STANDARDS IS GIVEN BELOW:

## SURROGATE RT FROM INITIAL CALIBRATION

TCX: 2.51 DCB: 8.99

SAMPLE CODE NO.	LAB SAMPLE ID	DATE ANALYZED	TIME ANALYZED	TCX RT	DCB RT	#
001 PEMA	EVALX97C	03/17/98	14:45	2.50	8.98	
002 MIXA1AA	MIXA198A	03/17/98	15:04	2.50	8.99	
003 MIXA2AA	MIXA298A	03/17/98	15:23	2.51	8.99	
004 MIXA3AA	MIXA398B	03/17/98	15:42	2.51	8.99	
005 MIXA4AA	MIXA498A	03/17/98	16:01	2.51	8.99	
006 MIXA5AA	MIXA598A	03/17/98	16:20	2.51	8.99	
007 TOXAXAA	TOXAX97D	03/17/98	18:32	2.51	8.99	
008 AR161AA	AR16197D	03/17/98	19:10	2.51	8.99	
009 AR162AA	AR16297D	03/17/98	19:29	2.51	8.99	
010 AR163AA	AR16397F	03/17/98	19:48	2.51	8.99	
011 AR164AA	AR16497D	03/17/98	20:07	2.51	8.99	
012 AR165AA	AR16597D	03/17/98	20:26	2.51	8.99	
013 AR21XAA	AR21X98A	03/17/98	20:44	2.50	8.99	
014 AR32XAA	AR32X98A	03/17/98	21:03	2.50	8.99	
015 AR42XAA	AR42X97D	03/17/98	21:22	2.50	8.98	
016 AR482AA	AR48297F	03/17/98	21:41	2.51	8.99	
017 AR542AA	AR54297E	03/17/98	22:00	2.51	8.99	
018 ZZZZZ	MDLAX97B	03/17/98	22:19			
019 ZZZZZ	MDLEX97A	03/17/98	22:37			
020 ZZZZZ	MD16X98A	03/17/98	22:56			
021 ZZZZZ	MDTXX98A	03/17/98	23:15			
022 ZZZZZ	MDCHX98A	03/17/98	23:34			
023 ZZZZZ	BLANKC	03/17/98	23:53	2.50	8.98	
024 PBLKU2	BLANKA	03/18/98	0:12	2.50	8.98	
025 LCSOS	LCSA	03/18/98	0:30	2.50	8.98	
026 SB279	2887307	03/18/98	0:49	2.50	8.98	
027 SB279MS	2887307	03/18/98	1:08	2.50	8.98	
028 SB279MSD	2887307	03/18/98	1:27	2.50	8.98	

## QC LIMITS

TCX = Tetrachloro-m-xylene (2.48 - 2.54 MINUTES)

DCB = Decachlorobiphenyl (8.96 - 9.02 MINUTES)

# Column used to flag retention time values with asterisk.

\* Values outside of QC limits.

8D

## PESTICIDE ANALYTICAL SEQUENCE

Lab Name: Lancaster Laboratories

Contract:

Lab Code: Case No.:

SAS No.: SDG No.: LKW01GC Column: RTX-CLP ID: 0.53 (mm)Init. Calib Date(s): 03/17/98 03/17/98Instrument: H1674ACalibration File: 1P6076

THIS ANALYTICAL SEQUENCE OF BLANKS, SAMPLES, AND STANDARDS IS GIVEN BELOW:

SURROGATE RT FROM INITIAL CALIBRATION						
	TCX: 2.51	DCB: 8.99				
SAMPLE CODE NO.	LAB SAMPLE ID	DATE ANALYZED	TIME ANALYZED	TCX RT #	DCB RT #	
029	SB581	2887310	03/18/98	1:46	2.50	8.98
030	SB681	2887311	03/18/98	2:05	2.50	8.98
031	ZZZZZ	BLANKA	03/18/98	2:24	2.50	8.98
032	ZZZZZ	LCSA	03/18/98	2:42	2.50	8.98
033	ZZZZZ	LCSDA	03/18/98	3:01	2.50	8.98
034	ZZZZZ	2889357	03/18/98	3:20	2.50	8.98
035	ZZZZZ	2889357	03/18/98	3:39	2.50	8.98
036	ZZZZZ	2889357	03/18/98	3:58	2.50	8.98
037	ZZZZZ	2886442	03/18/98	4:17	2.50	8.98
038	ZZZZZ	2888130	03/18/98	4:35	2.50	8.98
039	PEMCL	EVALX97C	03/18/98	4:54	2.50	8.98
040	MIXA3AT	MIXA398A	03/18/98	5:13	2.50	8.98
041	AR163ES	AR16397F	03/18/98	5:32	2.50	8.98

## QC LIMITS

TCX = Tetrachloro-m-xylene (2.48 - 2.54 MINUTES)

DCB = Decachlorobiphenyl (8.96 - 9.02 MINUTES)

# Column used to flag retention time values with asterisk.

\* Values outside of QC limits.

8D  
PESTICIDE ANALYTICAL SEQUENCE

Lab Name: Lancaster Laboratories

Contract:

Lab Code: Case No.:

SAS No.:

SDG No.: LKW01

GC Column: RTXCLPB ID: 0.53 (mm)

Init. Calib Date(s): 03/17/98 03/17/98

Instrument: H1674B

Calibration File: 1P6076B

THIS ANALYTICAL SEQUENCE OF BLANKS, SAMPLES, AND STANDARDS IS GIVEN BELOW:

SURROGATE RT FROM INITIAL CALIBRATION						
		TCX: 2.36	DCB: 9.32			
SAMPLE CODE NO.	LAB SAMPLE ID	DATE ANALYZED	TIME ANALYZED	TCX RT #	DCB RT #	
001	PEMAA	EVALX97C	03/17/98	14:45	2.35	
002	MIXA1AA	MIXA198A	03/17/98	15:04	2.36	
003	MIXA2AA	MIXA298A	03/17/98	15:23	2.36	
004	MIXA3AA	MIXA398B	03/17/98	15:42	2.36	
005	MIXA4AA	MIXA498A	03/17/98	16:01	2.36	
006	MIXA5AA	MIXA598A	03/17/98	16:20	2.36	
007	TOXAXAA	TOXAX97D	03/17/98	18:32	2.36	
008	AR161AA	AR16197D	03/17/98	19:10	2.36	
009	AR162AA	AR16297D	03/17/98	19:29	2.36	
010	AR163AA	AR16397F	03/17/98	19:48	2.36	
011	AR164AA	AR16497D	03/17/98	20:07	2.36	
012	AR165AA	AR16597D	03/17/98	20:26	2.35	
013	AR21XAA	AR21X98A	03/17/98	20:44	2.35	
014	AR32XAA	AR32X98A	03/17/98	21:03	2.35	
015	AR42XAA	AR42X97D	03/17/98	21:22	2.35	
016	AR482AA	AR48297F	03/17/98	21:41	2.35	
017	AR542AA	AR54297E	03/17/98	22:00	2.35	
018	ZZZZZ	MDLAX97B	03/17/98	22:19		
019	ZZZZZ	MDLEX97A	03/17/98	22:37		
020	ZZZZZ	MD16X98A	03/17/98	22:56		
021	ZZZZZ	MDTXX98A	03/17/98	23:15		
022	ZZZZZ	MDCHX98A	03/17/98	23:34		
023	ZZZZZ	BLANKC	03/17/98	23:53	2.35	
024	PBLKU2	BLANKA	03/18/98	0:12	2.35	
025	LCSOS	LCSA	03/18/98	0:30	2.35	
026	SB279	2887307	03/18/98	0:49	2.35	
027	SB279MS	2887307	03/18/98	1:08	2.35	
028	SB279MSD	2887307	03/18/98	1:27	2.35	

QC LIMITS

TCX = Tetrachloro-m-xylene

(2.33 - 2.39 MINUTES)

DCB = Decachlorobiphenyl

(9.29 - 9.35 MINUTES)

# Column used to flag retention time values with asterisk.  
\* Values outside of QC limits.

8D

## PESTICIDE ANALYTICAL SEQUENCE

Lab Name: Lancaster Laboratories

Contract:

Lab Code: Case No.:

SAS No.: SDG No.: LKW01GC Column: RTXCLPB ID: 0.53 (mm)Init. Calib Date(s): 03/17/98 03/17/98Instrument: H1674BCalibration File: 1P6076B

THIS ANALYTICAL SEQUENCE OF BLANKS, SAMPLES, AND STANDARDS IS GIVEN BELOW:

SURROGATE RT FROM INITIAL CALIBRATION						
	TCX: 2.36	DCB: 9.32				
SAMPLE CODE NO.	LAB SAMPLE ID	DATE ANALYZED	TIME ANALYZED	TCX RT #	DCB RT #	
029	SB581	288731C	03/18/98	1:46	2.35	9.31
030	SB681	288731C	03/18/98	2:05	2.35	9.31
031	ZZZZZ	BLANKA	03/18/98	2:24	2.35	9.31
032	ZZZZZ	LCSA	03/18/98	2:42	2.35	9.31
033	ZZZZZ	LCSDA	03/18/98	3:01	2.35	9.31
034	ZZZZZ	2889357	03/18/98	3:20	2.35	9.31
035	ZZZZZ	2889357	03/18/98	3:39	2.35	9.31
036	ZZZZZ	2889357	03/18/98	3:58	2.35	9.31
037	ZZZZZ	2886442	03/18/98	4:17	2.35	9.31
038	ZZZZZ	2888130	03/18/98	4:35	2.35	9.31
039	PEMCL	EVALX97C	03/18/98	4:54	2.35	9.31
040	MIXA3AT	MIXA398A	03/18/98	5:13	2.35	9.31
041	AR163ES	AR16397F	03/18/98	5:32	2.35	9.31

## QC LIMITS

TCX = Tetrachloro-m-xylene (2.33 - 2.39 MINUTES)

DCB = Decachlorobiphenyl (9.29 - 9.35 MINUTES)

# Column used to flag retention time values with asterisk.

\* Values outside of QC limits.



# Lancaster Laboratories

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*Where quality is a science.*

## Quality Control Summary

## Surrogate Recovery Volatile by GC - Water

## QC Limits

**LOW                    HIGH**

S1 (1Br4ClBn) = 1-Bromo-4-chlorobenzene (Hall Det)

70 130

S2 (1Br4ClBn) = 1-Bromo-4-chlorobenzene (PID Det)

70 130

\* Values outside QC limits

D Surrogates diluted out



**Lancaster Laboratories**  
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Sc. no. 141

### Quality Control Summary

~~Scienol~~  
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**Method Blank**

\*\*\* BLANK INFORMATION \*\*\*

Matrix.....: Water  
Batch Number.....: 97365A20  
Analysis Date.....: 12/31/97  
Analysis Time.....: 12:03  
Blank ID Number : BLK2016  
Instrument.....: 06245  
Concentration Units.....: ug/l

#### ABBREVIATION KEY

LQO = Limit of Quantitation

| ND = None Detected

|\* = above detection limit



Where quality is a science.

Quality Control Summary

Matrix Spike/Matrix Spike Duplicate  
Volatile by GC

Unspiked Sample Number.....: 2847740 Inj. : 06  
Spiked Sample Number.....: 2847740 + Spike Inj. : 07  
Spiked Dup Sample Number....: 2847740 + Spike Inj. : 08

Batch Number.....: 97365A20 Date : 12/31/97  
Matrix.....: Water  
Instrument.....: 06245

This MS/MSD		Spike	Sample	MS	MSD	MS	MSD	QC	QC
applies to the		Added	Conc	Conc	Conc	%	%	Limits	RPD
following samples		Compound	(ug/l)	(ug/l)	(ug/l)	REC	REC	REC	RPD
2848269	Chloromethane	100.5	ND	99.6	96.8	99	96	18 -134	2.8
2848270	Vinyl Chloride	100.5	ND	110.4	115.5	110	115	49 -145	4.6
2848271	Bromomethane	100.5	ND	99.9	101.3	99	101	54 -134	1.3
BLK2016	Chloroethane	100.5	ND	113.2	111.1	113	111	50 -133	1.9
BLK2019	Trichlorofluoromethane	100.5	ND	108.4	113.3	108	113	45 -128	4.4
	1,1-Dichloroethene	100.5	ND	111.1	108.8	111	108	76 -135	2.1
	Methylene Chloride	100.0	ND	111.7	110.6	112	111	67 -134	1.0
	trans-1,2-Dichloroethene	100.0	ND	100.3	101.9	100	102	81 -125	1.6
	1,1-Dichloroethane	100.5	ND	109.0	109.4	108	109	81 -127	0.4
	cis-1,2-Dichloroethene	100.0	ND	116.6	119.1	117	119	87 -132	2.1
	Chloroform	100.5	ND	110.2	111.8	110	111	82 -124	1.4
	1,2-Dichloroethane	100.5	ND	114.7	114.8	114	114	82 -120	0.1
	1,1,1-Trichloroethane	100.5	ND	107.3	108.9	107	108	80 -129	1.5
	Carbon Tetrachloride	100.5	ND	107.8	110.3	107	110	79 -135	2.3
	1,2-Dichloropropane	100.5	ND	113.1	111.9	113	111	82 -121	1.1
	Bromodichloromethane	100.0	ND	109.3	108.8	109	109	74 -125	0.4
	cis-1,3-Dichloropropene	101.0	ND	111.3	111.1	110	110	79 -131	0.1
	trans-1,3-Dichloropropene	101.0	ND	112.8	109.9	112	109	64 -120	2.7
	1,1,2-Trichloroethane	101.0	ND	120.6	117.2	119	116	81 -120	2.9
	Dibromochloromethane	100.0	ND	106.7	103.4	107	103	64 -127	3.2
	Tetrachloroethene	100.5	ND	111.6	106.6	111	106	77 -138	4.6
	Bromoform	100.5	ND	96.0	93.9	96	93	56 -139	2.3
	1,1,2,2-Tetrachloroethane	100.5	ND	125.9	124.1	125	123	70 -135	1.4
	Trichloroethene	100.5	0.3	93.8	94.4	93	94	77 -132	0.6
	Chlorobenzene	100.5	ND	96.6	97.1	96	97	83 -119	0.5

ABBREVIATION KEY

MS = Matrix Spike

MSD = Matrix Spike Duplicate

ND = None Detected

RPD = Relative Percent Difference

The RPD limits are advisory and are evaluated in relation to the other QC.



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Quality Control Summary

Initial Calibration

Volatiles by GC

Calibration Batch.....: 97358A20

Sample Batch Number.....: 97365A20

Calibration Date.....: 12/24/97

Instrument.....: 06245

Compound	Laboratory Standard ID									Fit	ID					
	Inj #04	Inj #12	Inj #06	Inj #13	Inj #08	Inj #09	Rf STD 1	Rf STD 2	Rf STD 3	Rf STD 4	Rf STD 5	Rf STD 6	AVE RF	%RSD	Type	RT
Chloromethane	661.03	580.23	581.51	531.07	485.78	474.05	552.28	12.7	QUAD	4.12	+/- 0.2 m					
Vinyl Chloride	603.72	516.96	495.66	451.49	389.07	387.33	474.04	17.5	QUAD	4.47	+/- 0.2 m					
Bromomethane	314.58	286.34	289.53	276.33	259.97	274.23	283.50	6.5	AVG	5.19	+/- 0.2 m					
Chloroethane	571.57	503.92	496.28	467.38	420.24	446.10	484.25	10.9	QUAD	5.49	+/- 0.2 m					
Trichlorofluoromethane	315.60	288.10	262.89	253.76	201.26	248.65	261.71	14.8	QUAD	6.73	+/- 0.2 m					
1,1-Dichloroethene	936.95	759.74	750.58	700.07	601.33	514.80	710.58	20.5	QUAD	8.09	+/- 0.2 m					
Methylene Chloride	2256.54	1245.97	1115.73	966.07	831.07	731.40	1191.13	46.5	QUAD	8.57	+/- 0.2 m					
trans-1,2-Dichloroethene	1283.17	1097.13	1078.71	1016.25	877.95	740.40	1015.60	18.5	QUAD	10.44	+/- 0.2 m					
1,1-Dichloroethane	1288.14	1086.90	1081.98	1016.92	874.81	739.19	1014.66	18.7	QUAD	11.11	+/- 0.2 m					
cis-1,2-Dichloroethene	1480.72	1252.35	1281.24	1185.88	1033.22	877.05	1185.08	17.7	QUAD	12.70	+/- 0.2 m					
Chloroform	2033.60	1688.06	1660.46	1483.37	1265.88	1066.94	1533.05	22.3	QUAD	13.28	+/- 0.1 m					
1,2-Dichloroethane	1373.51	1194.04	1252.11	1132.39	993.18	850.14	1132.56	16.5	QUAD	14.99	+/- 0.2 m					
1,1,1-Trichloroethane	1538.44	1248.51	1265.83	1119.12	951.04	799.23	1153.70	22.5	QUAD	15.24	+/- 0.2 m					
Carbon Tetrachloride	2264.00	1860.12	1825.87	1620.66	1334.92	1102.08	1667.94	24.7	QUAD	16.08	+/- 0.2 m					
1,2-Dichloropropane	2332.36	1990.53	2003.11	1753.36	1529.27	1309.93	1819.76	20.2	QUAD	17.33	+/- 0.2 m					
Bromodichloromethane	2839.20	2278.95	2195.59	1908.49	1678.40	1502.14	2067.13	23.2	QUAD	17.48	+/- 0.1 m					
cis-1,3-Dichloropropene	2759.41	2384.04	2366.26	2066.97	1766.53	1514.86	2143.01	21.2	QUAD	18.50	+/- 0.2 m					
trans-1,3-Dichloropropene	2584.71	2355.60	2328.99	2078.07	1822.55	1508.09	2113.00	18.7	QUAD	19.09	+/- 0.1 m					
1,1,2-Trichloroethane	3336.88	2846.11	2835.95	2444.60	2066.54	1750.38	2546.74	22.7	QUAD	19.24	+/- 0.1 m					
Dibromochloromethane	2001.74	1874.28	1820.27	1695.51	1543.74	1452.46	1731.33	12.0	QUAD	19.79	+/- 0.2 m					
Tetrachloroethene	4736.60	3904.36	3749.22	3231.04	2614.33	2158.83	3399.06	27.4	QUAD	20.26	+/- 0.2 m					
Bromoform	1171.38	1213.50	1210.05	1182.17	1110.83	1092.10	1163.34	4.4	AVG	21.40	+/- 0.2 m					
1,1,2,2-Tetrachloroethane	2058.86	2270.49	2229.15	2001.40	1650.96	1328.60	1923.24	19.0	QUAD	21.68	+/- 0.1 m					
Trichloroethene	0.041279	0.038472	0.038471	0.037770	0.036335	0.035616	0.037990	5.2	AVG	17.41	+/- 0.2 m					
Chlorobenzene	0.105479	0.104735	0.104864	0.100145	0.096586	0.091207	0.100503	5.7	AVG	20.94	+/- 0.2 m					

For initial calibration 12/24/97, the average response factor was used for all compounds with and RSD less than or equal to 10%.

This initial calibration applies to samples: 2848269 2847740 UNSPK BLK2016  
2848270 2847740 MS BLK2019  
2848271 2847740 MSD



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### **Quality Control Summary**

### **Check Standard Summary**

### Retention Time

## Volatiles by GC

Initial Calibration Date.....: 12/24/97  
Check Standard Batch.....: 97363A20  
Sample Batch.....: 97365A20  
Injection Number.....: 47  
Injection Date.....: 12/31/97  
Instrument.....: 06245



Initial Calibration Date ..... 12/24/97  
Initial Calibration Batch..... 97358A20  
Sample Batch..... ..... 97365A20  
Instrument..... ..... 06245

#### SURROGATE RT FROM INITIAL CALIBRATION

| 1Br4ClBn (Hall): 24.34 | 1Br4ClBn (PID): 24.34



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### Quality Control Summary

## Continuing Calibration

Volatiles by GC

Check Standard Batch Number: 97363A20

Calibration Date.....: 12/24/97

Batch Number.....: 97365A20

Continuing Calibration Date...: 12/31/97

Inj #.....:.....: 47

Concentration Units..... ug/l

Injection Time.....: 10:23

Instrument ID.....: 06245



Quality Control Summary  
TOTAL ORGANIC CARBON  
Method Blank  
Instrumental Analysis

Method Blank Analysis		Matrix: SOIL						
Method Blank Designation	LLI Sample No.	Client Designation	Analysis Method	Date	Batch Number	Blank Result	Units	LOQ
BLANK	2302108	Q17T1	TOC	5/04/95	95118-201	< LOQ	mg/kg	50
	2302109	Q17T2						
	2302110	Q17T3						
	2302111	Q17T4						
	2302112	Q16T2						
	2302113	Q16T3						
	2302114	Q16T4						
	2302115	Q16T5						
	2302116	Q16S2						
	2302108	SPK, DUP						
BLANK	2303628	S20-8	TOC	5/04/95	95122-201	< LOQ	mg/kg	50
	2303629	S20-9						
	2303630	S2010						
	2303631	S2011						
	2303633	S19S5						
BLANK	2303632	R19S4	TOC	5/18/95	95122-201 *	< LOQ	mg/kg	50
	2303634	S19S4						
	2303635	S1942						

Comments: The blank is acceptable when the result is less than the limit of quantitation.

\* The blank prepped with the repeated samples retains the original batch number.

ABBREVIATION KEY

IC = Ion Chromatography	-- = Analysis Not Requested
D = Distillation	ND = Not Detected
TOC = Total Organic Carbon	AK = AlpKem
TOX = Total Organic Halogens	LOQ = Limit of Quantitation
* = Out of Specification	NA = Not Applicable



## Quality Control Summary

Matrix Spike Analysis  
Instrumental Analysis

Sample Information		Matrix Spike Analysis				Matrix: SOIL					
LLI	Client	Parameter	Analysis	Unspiked	Unspiked	Spiked	Spike	Spiked	Result	Units	%REC
Sample No.	Designation			Meth	Date	Desig.	Result	LOQ	Desig.	Added	
2302108	Q17T1	Total									
2302109	Q17T2	Organic									
2302110	Q17T3	Carbon									
2302111	Q17T4										
2302112	Q16T2										
2302113	Q16T3										
2302114	Q16T4										
2302115	Q16T5										
2302116	Q1652										
2303628	S20-8										
2303629	S20-9										
2303630	S2010										
2303631	S2011										
2303632	S19S4										
2303633	S19S5										
2303634	S19S4										
2303635	S1942										

Comments:

X Recovery Control Limit 75  
X Recovery Control Limit 125

ABBREVIATION KEY	
IC	= Ion Chromatography
D	= Distillation
TOC	= Total Organic Carbon
TOX	= Total Organic Halogens
*	= Out of Specification
---	= Analysis Not Requested
ND	= Not Detected
AK	= Alpkem
LOQ	= Limit of Quantitation
NA	= Not Applicable



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Quality Control Summary

Duplicate Analysis

Instrumental Analysis

Sample Information		Duplicate Analysis						Matrix: SOIL			
LLI	Client	Parameter	Analysis	1st Dup	1st Dup	LOQ	2nd Dup	2nd Dup	RPD	Control	
Sample No.	Designation	Meth	Date	Desig.	Result	Desig.	Result	Units	(%)	Limit %	
2302108	017T1	Total									
2302109	017T2	Organic									
2302110	017T3	Carbon	TOC	5/04/95	8KG	32439	4000	DUP	33673	mg/kg	
2302111	017T4										
2302112	016T2										
2302113	016T3										
2302114	016T4										
2302115	016T5										
2302116	01652										
2303628	S20-8										
2303629	S20-9										
2303630	S2010										
2303631	S2011										
2303632	S19S4										
2303633	S19S5										
2303634	S19S4										
2303635	S1942										

Comments: If one or more sample values are less than the limit of quantitation, the RPD is not calculated.

ABBREVIATION KEY

IC	= Ion Chromatography	--- = Analysis Not Requested
D	= Distillation	ND = Not Detected
TOC	= Total Organic Carbon	AK = AlpKem
TOX	= Total Organic Halogens	LOQ = Limit of Quantitation
*	= Out of Specification	NA = Not Applicable



Quality Control Summary  
Laboratory Control Standard  
Instrumental Analysis

Comments: The recovery range for the LCS is +/- 20%.

ABBREVIATION KEY

IC = Ion Chromatography	--- = Analysis Not Requested
D = Distillation	ND = Not Detected
TOC = Total Organic Carbon	AK = AlpKem
TOX = Total Organic Halogens	LOQ = Limit of Quantitation
* = Out of Specification	NA = Not Applicable



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## **Quality Control Summary**

### **Initial Calibration & Linearity Check**

## Instrumental Analysis

## **TOTAL ORGANIC CARBON**

### **Instrument Identification**

Calibration Date: 5/06/95

MATRIX: SOIL

## MATRIX: SOIL

Std mass: 25.0000 ug  
Scaling Factor: 0.04080 cl mV

Batch Numbers: 95118-201

Blank: 41.1680 mv

Standard: 624.385 mv

Blank: 30,9270 mv

Standard: 610.960 mv

Blank: 41.3370 mv

Standard: 602.709 mv

Average: 37.8107 μV

Average: 612.685 mV

Continuing Calibration Dates: 5/04/95

Concentration units: mg/l

Parameter	Reference	Result	%	Acceptance Range		Out of Specification
				TOC	Concentration	
				Cont. Cal	Rec.	-/+ 10%
CCV		25.0	25.623	102.5	22.5	27.5
CCV		25.0	25.250	101.0	22.5	27.5
CCV		25.0	26.023	104.1	22.5	27.5
CCV		25.0	26.262	105.0	22.5	27.5



## Quality Control Summary

Method Blank  
Miscellaneous Wet Chemistry

Method Blank Analysis						Matrix:			
Method Blank Designation	LL Sample No.	Sample Code	Method	Analysis Date	Batch Number	Blank Result	Units	LOQ	

Comments: The blank is acceptable when the result is less than the limit of quantitation.

## ABBREVIATION KEY

TI = Titration	ND = Not Detected
CO = Colorimetric	J = Estimated Value < LOQ
IR = Infrared Spectrophotometry	< = Less Than
OD = Oven Dried	LOQ = Limit of Quantitation
DI = Distillation	NA = Not Applicable
G = Gravimetric	M = Meter
U = Under Method Detection Limit	* = Out of Specification



## **Matrix Spike Analysis Miscellaneous Wet Chemistry**

Comments: Sample values shown may be rounded to be consistent with the limit of quantitation.

## ABBREVIATION KEY

TI = Titration	ND = Not Detected
CO = Colorimetric	J = Estimated Value < LOQ
IR = Infrared Spectrophotometry	< = Less Than
OD = Oven Dried	LOQ = Limit of Quantitation
DI = Distillation	NA = Not Applicable
G = Gravimetric	M = Meter
U = Under Method Detection Limit	* = Out of Specification



## Quality Control Summary

## Duplicate Analysis

## Miscellaneous Wet Chemistry

Sample Information		Duplicate Analysis					Matrix:					
LL Sample No.	Sample Code	Parameter	Meth	Analysis Date	1st Dup Desig.	1st Dup Result	LOQ	2nd Dup Desig.	2nd Dup Result	Units	RPD (%)	Lfm <...

Comments: If one or more sample values are less than the limit of quantitation, the RPD is not required.

Sample values shown may be rounded to be consistent with the limit of quantitation.

## ABBREVIATION KEY

TI = Titration	ND = Not Detected
CO = Colorimetric	J = Estimated Value < LOQ
IR = Infrared Spectrophotometry	< = Less Than
OD = Oven Dried	LOQ = Limit of Quantitation
DI = Distillation	NA = Not Applicable
G = Gravimetric	M = Meter
U = Under Method Detection Limit	* = Out of Specification



## Quality Control Summary

Laboratory Control Standard  
Laboratory Control Standard Duplicate  
Miscellaneous Wet Chemistry

Sample Information		Laboratory Control Standards					Matrix:				
LL Sample No.	Sample Code	Parameter	Analysis Date	True LCS/D Value	LCS Result	LCSD Result	LOQ	Units	LCS/D Acceptance Range	% RPD Result	X RPD Acceptance < / >

Comments: LCS/LCSD values shown may be rounded to be consistent with the limit of quantitation.



### **Quality Control Summary**

**Calibration Date:**

Batch Number:

**Initial Calibration  
Miscellaneous Wet Chemistry  
Instrument Identification:**

Calibration Date:

Batch Number: